

# Jacopo Grilli

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## CONTACT INFORMATION

Associate Research Officer  
Abdus Salam International Centre for Theoretical  
Physics (ICTP)  
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## VITA

- May 2019 to present  
Associate Research Officer at Quantitative Life Sciences, ICTP, Trieste, Italy.
  - January 2018 to April 2019  
Omidyar Postdoctoral Fellow at Santa Fe Institute, Santa Fe, NM, USA.
  - January 2015 to December 2017  
Postdoctoral Scholar at Department of Ecology and Evolution, University of Chicago, Chicago, IL, USA.  
Advisor: S. Allesina
  - January 2012 to February 2015  
Ph.D. in Physics at Università degli Studi di Padova, Padova, Italy.  
Advisor: A. Maritan
  - October 2011 to December 2011  
Post-Master Scholarship ‘ex 60%’ 2011 at Department of Physics and Astronomy G. Galilei, Università degli Studi di Padova, Padova, Italy.
  - October 2009 to July 2011  
M.S. in Theoretical Physics at Università degli Studi di Milano.  
Advisors: A. Maritan and B. Bassetti. Final grade *110/110 cum Laude*.
  - October 2006 to October 2009  
B.S. in Physics at Università degli Studi di Milano.  
Advisors: B. Bassetti and M. Cosentino Lagomarsino. Final grade *110/110 cum Laude*.
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## EDITOR

*Plos Computational Biology* (Associate Editor, 2019- )

*Oikos* (Editorial board, 2018- )

*Royal Society Open Science* (Associate Editor, 2021- )

*Plos Computational Biology* (Guest Editor, 2018-2019 )

*Complexity* (Special issue “Scales and Complexity in Ecological Communities: Models, Methods, and Predictions”, 2018)

## REVIEWER

Grants: *European Research Council (EU)*, *National Science Foundation (USA)*, *Swiss National Science Foundation (Switzerland)*, *Israel Science Foundation (Israel)*

Journals: *Science*, *Nature Ecology and Evolution*, *Nature Communications*, *Science Advances*, *PNAS*, *eLife*, *Physical Review Letters*, *Plos Computational Biology*, *Physical Review X*, *Ecology Letters*, *The ISME Journal*, *American Naturalist*, *Proceedings of the Royal Society B*, *Proceedings of the Royal Society A*, *Journal of Statistical Mechanics*, *Journal of Statistical Physics*, *Physical Review E*, *Frontiers in Ecology and Evolution*, *Scientific Reports*, *Plos One*, *npj Systems Biology*

ORGANIZED  
 CONFERENCES AND  
 WORKSHOPS

- February 20 - March 17, 2023  
*ICTP-TQLS workshop, Inequality Across Scales, Space, Time and Domains.*
- February 20 - March 17, 2023  
*ICTP School, Spring College on the Physics of Complex Systems.*
- July 25 - July 29, 2022  
*ICTP Workshop, Quantitative Human Ecology.*
- June 6 - June 24, 2022  
*★ICTP Huddle, Eco-evolutionary Dynamics of Microbial Communities Across Scales.*
- 27 October 2021  
*ReACT, workshop on Robustness, Adaptability and Critical Transitions in Living Systems (CCS 2021 satellite meeting). Lyon, France.*
- January 19 - January 21, 2021  
*★ICTP Workshop, Workshop on Limits to Diversity Assembly. [remotely]*
- November 30 - December 17, 2020  
*★ICTP Winter School, Quantitative Approaches in Ecosystem Ecology. [remotely]*
- February 10-12, 2020  
*★SFI Working Group, Aging in Single-celled Organisms: from Bacteria to the Whole Tree of Life. Santa Fe, NM, USA.*
- January 20-25, 2020  
*★ICTP-SAIFR School, Community Ecology: from patterns to principles. São Paulo, SP, Brazil.*
- 4-6 March 2019  
*★SFI Working Group, Higher-Order Interactions: Experiments, Inference and Models. Santa Fe, NM, USA.*
- 29-31 January 2019  
*★ SFI Working Group, Irreversibility in Ecological Evolution. Santa Fe, NM, USA.*
- 12 June 2018  
*EcoNet, workshop on ecological network: spandrels, selection and assembly (NetSci 2018 satellite meeting). Paris, France.*
- 20 September 2016  
*LIVING 2.0, workshop on Robustness, Adaptability and Critical Transitions in Living Systems (CCS 2016 satellite meeting). Amsterdam, The Neatherland.*
- 16-19 September 2015  
*Living Systems: from Interaction Patterns to Critical Behavior. Venice, Italy*
- 25 September 2014  
*LIVING, workshop on Robustness, Adaptability and Critical Transitions in Living Systems (ECCS 2014 satellite meeting). Lucca, Italy*

★ indicates that I was the leading organizer

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SEMINARS AT  
INSTITUTIONS

- March 24, 2023. Population Dynamics Online Seminar Series [remotely].  
Invited Talk: *What is typical in microbial communities?*
- February 16, 2023. Department of Physics University of Trento, Trento, Italy.  
Invited Talk: *What is typical in microbial communities?*
- February 7, 2023. NCCR Microbiomes, Switzerland [remotely]. *What is typical in microbial communities?*
- April 28, 2022. Area Science Park, Trieste, Italy. *What is typical in microbial communities?*
- November 24, 2021. Dept of Physics, Ecole Normale Supérieure, Paris, France.  
*What is typical in microbial communities?*
- October 5, 2021. Lecture Series in Ecology and Evolution, Institute of Ecology and Evolution, Universität Bern, Switzerland [remotely]. *What is typical in microbial communities?*
- April 14, 2021. Centre for Ecological Sciences, Indian Institute of Science, India [remotely]. *What is typical in microbial communities?*
- March 19, 2021. Instituto Carlos I, university of Granada, Spain [remotely].  
*What is typical in microbial communities?*
- February 25, 2021. Biological Complexity Unit, Okinawa Institute of Science and Technology, Japan [remotely]. *What is typical in microbial communities?*
- November 4, 2020. EESB seminars, MIT, US [remotely]. *What is typical in microbial communities?*
- September 30, 2020. Department of Biology, Hong Kong Baptist University, Hong Kong [remotely]. *Laws of diversity and variation in microbial communities.*
- August 24, 2020. Dept. of Physics, University of Florida, US [remotely].  
Invited seminar: *Laws of diversity and variation in microbial communities.*
- April 21, 2020. Rockefeller university, US [remotely].  
Invited seminar: *Laws of diversity and variation in microbial communities.*
- July 30, 2019. Statistical Biophysics Seminar, SISSA, Trieste, Italy.  
Invited seminar: *Laws of diversity and variation in microbial communities.*
- February 4, 2019. CNLS, LANL, Los Alamos, NM, USA.  
Invited seminar: *Higher-order interactions stabilize the dynamics of ecological communities.*
- December 14, 2018. Department of Ecology, USP, São Paulo, SP, Brazil.  
Invited seminar: *Higher-order interactions stabilize the dynamics of ecological communities.*
- December 13, 2018. ICTP-SAIFR, São Paulo, SP, Brazil.  
Invited seminar: *Higher-order interactions stabilize the dynamics of ecological communities.*
- May 2, 2017. International Centre for Theoretical Physics, Trieste, Italy.  
Invited seminar: *Higher-order interactions stabilize the dynamics of ecological communities.*
- January 26, 2017. Santa Fe Institute, Santa Fe, NM, USA.  
Invited seminar: *Higher-order interactions stabilize the dynamics of ecological communities.*

- April 15, 2016. Laboratory of Computational and Quantitative Biology, UPMC, Paris, France.  
Invited seminar: *Coexistence in large ecosystems: from structure to function.*
- April 12, 2016. International Centre for Theoretical Physics, Trieste, Italy.  
Invited seminar: *Coexistence in large ecosystems: from structure to function.*
- May 26, 2015. The University of Chicago, Chicago, USA.  
Seminar: *Stability and feasibility of large ecosystems.*
- March 26, 2015. Wageningen University, Wageningen, The Neatherlands.  
Invited seminar: *On the stability of large ecosystems.*
- November 3, 2014. Department of Environmental Systems Science, ETH, Zürich, Switzerland.  
Invited seminar: *Spatial aggregation and spatial fragmentation: simple random models for spatial ecology.*
- October 6, 2014. Dipartimento di Fisica, Università di Torino, Torino, Italy.  
Invited seminar: *Scaling laws in genome evolution.*
- December 17, 2013. University of Illinois at Urbana-Champaign, Urbana-Champaign, IL, USA.  
Invited seminar: *Emergence of criticality in living systems through adaptation and evolution.*

#### TALKS AT MEETINGS

- June 15-16, 2023. Ecological perturbations across systems and scales, University of Granada, Granada, Spain.  
Invited Talk: *Non-catastrophic shift in the human gut microbiome*
- February 14, 2023. Kickoff meeting HFSP grant, University of Padova, Padova, Italy.  
Invited Talk: *What is typical in microbial communities*
- September 14-16, 2022. [Mathematical modelling of microbiomes](#), MPI for Evolutionary Biology, Plön, Germany.  
Keynote Talk: *What is typical in microbial communities?*
- April 7, 2022. [Spring workshop on Physics of Data](#), Venice, Italy.  
Invited Talk: *What is typical in microbial communities?*
- November 4, 2021. [School on the Analysis of Microbial Time Series Data](#), KU Leuven [remotely].  
Invited Talk: *What is typical in microbial communities?*
- September 18, 2020. [Toponet 2020](#), Netsci [remotely].  
Invited Talk: *Higher-order interactions in ecological systems.*
- August 25, 2020. [Theory and Modeling of Living System](#) symposium, Emory College [remotely].  
Invited Talk: *Laws of diversity and variation in microbial communities.*
- December 9-10, 2019. [Quantitative Methods in Gene Regulation V](#), London, UK.  
Invited Talk: *Laws of diversity and variation in microbial communities.*
- November 26, 2019. [Master di Comunicazione della Scienza](#), SISSA, Trieste, Italy.  
Invited Lecture: *Physics of complex ecological phenomena.*
- September 2-6, 2019. [Model-Guided Data Science](#), Como, Italy.  
Invited Talk: *Laws of diversity and variation in microbial communities.*

- August 19-23, 2019. [Out-of-Equilibrium Processes in Evolution and Ecology](#), Casa Matematica Oaxaca, Oaxaca, Mexico.  
Invited Talk: *Macroecological laws across microbial communities*.
- July 1-3, 2019. [ccs/italy 2019](#), Fondazione Bruno Kessler, Trento, Italy.  
Invited Talk: *Macroecological laws across microbial communities*.
- February 13-15, 2019. [PyeongChang Forum](#), PyeongChang, South Korea.  
Invited Talk: *Mysteries and Laws of Biodiversity*.
- February 11, 2019. SFI-SNU Miniworkshop, Seoul National University, Seoul, South Korea.  
Invited Talk: *Higher-order interactions stabilize dynamics in competitive network models*.
- September 26, 2018. [ReAct 3 \(CCS 2018 Satellite Meeting\)](#), Thessaloniki, Greece.  
Invited Talk: *Higher-order interactions stabilize dynamics in competitive network models*.
- July 23 - July 25, 2018. Working group: [Cognitive Regime Shifts I](#), Santa Fe, United States.  
Invited Talk: *On the stability of large ecological communities*.
- May 7 - March 11, 2018. [Statistical physics of cells and genomes](#), Alghero, Italy.  
Invited Talk: *Diversity in ecological communities*.
- March 5 - March 9, 2018. [APS March Meeting](#), Los Angeles, CA, USA.  
Talk: *Statistical physics of (meta)genomes*.
- February 27, 2017. [Second Science of Science Meeting](#), Chicago, IL, USA.  
Invited talk: *What's in a Last Name? Mobility, Gender Imbalance and Nepotism across Academic Systems*
- August 9 - August 14, 2015. [100th ESA Conference](#), Baltimore, MD, USA.  
Talk: *Feasibility and stability of large ecosystems*.
- June 15 - June 19, 2015. [Granada Seminar](#), La Herradura, Spain.  
Talk: *Persistence of a population in randomly fragmented landscapes*.
- December 18, 2014. [Workshop on Physics of Complex Systems](#), Padova, Italy.  
Invited talk: *Emergence of criticality in communities of living systems*.
- September 22 - September 26, 2014. [ECCS 2014, European Conference on Complex Systems](#), Lucca, Italy.  
Talk: *Persistence of a population in randomly fragmented landscapes*.
- September 16 - September 20, 2013. [ECCS 2013, European Conference on Complex Systems](#), Barcelona, Spain.  
Talk: *Emergence of criticality in living systems through adaptation and evolution*.
- June 27 - July 5, 2013. [Workshop on Quantitative Laws of Genome Evolution](#), Como, Italy.  
Talk: *Universal properties of ecological interactions and stability of ecosystems*.  
Awarded as F1000 Best Young Presentation.
- March 13 - 15, 2013. [CompleNet 2013, IV Workshop on Complex Networks](#), Berlin, Germany.  
Poster: *Complexity-stability relation in ecological networks*
- December 20, 2012. [Workshop on Physics of Complex Systems](#), Padova, Italy.  
Invited talk: *Growth or Reproduction? Emergence of a Strategy*
- November 9, 2012. [Scientific day in honor of Bruno Bassetti](#), Milan, Italy.  
Invited talk: *Growth or Reproduction? Emergence of a Strategy*

- July 23 - August 3, 2012. Summer School “Emergent Order in Biology”, Cargese, France.  
Poster: *Emergence of scaling laws in functional and evolutionary partitioning of genomes*
- June 20 - 22, 2012. XVII Conference on Statistical Physics and Complex Systems, Parma, Italy.  
Talk: *Spatial distribution of species across scales*

#### SCIENTIFIC VISITS

- November 18, 2013 to May 30, 2014  
Visiting Student at Department of Ecology and Evolution, The University of Chicago, Chicago, IL, USA.
- July 22, 2013 to August 3, 2013  
Visiting Student at Departamento de Electromagnetismo y Física de la Materia, Universidad de Granada, Granada, Spain.
- February 20, 2012 to March 31, 2012  
Visiting Student at Genomic Physics Group, Genomique des Microorganismes, UMR 7238 CNRS - Université Pierre et Marie Curie, Paris, France.
- June 1, 2010 to June 28, 2010  
Summer Internship under the supervision of S. Maslov at Department of Condensed Matter Physics, Brookhaven National Laboratory, Upton, NY, USA.

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#### PUBLICATIONS

- [1] L. Fant, O. Mazarrisi, E. Panizon, and J. Grilli. Stable cooperation emerges in stochastic multiplicative growth. *Physical Review E*. 108, L012401. 2023.  
doi:10.1103/PhysRevE.108.L012401 arXiv:2202.02787
- [2] J. Grilli. Keystone intransitive loops. *Proceedings of the National Academy of Sciences* (commentary). 120 (17), e2304170120. 2023.  
doi:10.1073/pnas.2304170120
- [3] I Macocco, A Glielmo, J. Grilli, and A. Laio. Intrinsic Dimension Estimation for Discrete Metrics. *Physical Review Letters*. 130 (6), 067401. 2023.  
doi:PhysRevLett.130.067401 arXiv:2207.09688
- [4] R.E. Szabo, S. Pontrelli, J. Grilli, J.A. Schwartzman, S. Pollak, U. Sauer, O.X. Cordero. Historical contingencies and phage induction diversify bacterioplankton communities at the microscale. *Proceedings of the National Academy of Sciences*. 119 (30), e2117748119 2022.  
doi:10.1073/pnas.2117748119 bioRxiv:10.1101/2021.09.27.461956
- [5] M. Cosentino Lagomarsino, G. Pacifico, V. Firmano, E. Bella, P. Benzoni, J. Grilli, F. Bassetti, F. Capuani, P. Cicuta, and M. Gherardi. Remote teaching data-driven physical modeling through a COVID-19 data challenge. *European Journal of Physics*. 43 (5), 055708 2022.  
doi:10.1088/1361-6404/ac79e1 arXiv:2104.09394
- [6] L. Calabrese, J. Grilli, M. Osella, C.P. Kempes, M. Cosentino Lagomarsino, and L. Ciandrini. Role of protein degradation in growth laws. *Plos Computational Biology*. 18(5):e1010059 2022.  
doi:10.1371/journal.pcbi.1010059 bioRxiv:10.1101/2021.03.25.436692
- [7] S. Zaoli and J. Grilli. The stochastic logistic model with correlated carrying capacities reproduces beta-diversity metrics of microbial communities. *Plos Computational Biology*. 18(4):e1010043. 2022.  
doi:10.1371/journal.pcbi.1010043 bioRxiv:10.1101/2021.11.16.468765

- [8] F. Büke, J. Grilli, M. Cosentino Lagomarsino, G. Bokinsky, and S. Tans. ppGpp is a bacterial cell size regulator. *Current Biology*. 32(4):870-877. 2022.  
doi:10.1016/j.cub.2021.12.033 bioRxiv:10.1101/2020.06.16.154187
- [9] F. de Castro, S.M. Adl, S. Allesina, R.D. Bardgett, T. Bolger, J.J. Dalzell, M. Emmerson, T. Fleming, D. Garlaschelli, J. Grilli, S.E. Hannula, F. de Vries, Z. Lindo, A.G. Maule, M. pik, M.C. Rillig, S.D. Veresoglou, D.H. Wall, T. Caruso. Local stability properties of complex, species-rich soil food webs with functional block structure. *Ecology and Evolution*. 0 (0), 1-12. 2021.  
doi:10.1002/ece3.8278
- [10] S. Zaoli and J. Grilli. A macroecological description of alternative stable states reproduces intra-and inter-host variability of gut microbiome. *Science Advances*. 7 (43), eabj2882. 2021.  
doi:10.1126/sciadv.abj2882 bioRxiv:10.1101/2021.02.12.430897
- [11] L. Descheemaeker, J. Grilli, and S. de Buyl. Heavy-tailed abundance distributions from stochastic Lotka-Volterra models. *Physical Review E*. 104, 034404. 2021.  
doi:10.1103/PhysRevE.104.034404 bioRxiv:10.1101/2021.02.19.431657
- [12] M. Panlilio, J. Grilli, G. Tallarico, B. Sclavi, P. Cicuta, and M. Cosentino Lagomarsino. Threshold accumulation of a constitutive protein explains *E. coli* cell division behavior in nutrient upshifts. *Proceedings of the National Academy of Sciences*. 118(18):e2016391118. 2021.  
doi:10.1073/pnas.2016391118 bioRxiv:10.1101/2020.08.03.233908
- [13] J. Grilli.  
Macroecological laws describe variation and diversity in microbial communities. *Nature Communications*. 11, 4743 2020.  
doi:10.1038/s41467-020-18529-y bioRxiv:10.1101/680454v1
- [14] K. Jovic<sup>‡</sup>, J. Grilli<sup>‡</sup>, M.G. Sterken, B.L. Snoek, J.A.G. Riksen, S. Allesina, J.E. Kammenga.  
Transcriptome dynamics predict thermotolerance in *Caenorhabditis elegans*. *BMC Biology*. 17, 102. 2019.  
doi:10.1186/s12915-019-0725-6 bioRxiv:10.1101/661652v2
- [15] C. Tu, S. Suweis, J. Grilli, M. Formentin and A. Maritan. Reconciling cooperation, biodiversity and stability in complex ecological communities. *Scientific Reports*. 9, 5580. 2019.  
doi:10.1038/s41598-019-41614-2 arXiv:1708.03154
- [16] G. Micali<sup>‡</sup>, J. Grilli<sup>‡</sup>, M. Osella, and M. Cosentino Lagomarsino. Concurrent processes set *E. coli* cell division. *Science Advances*. 4, eaau3324. 2018.  
doi:10.1126/sciadv.aau3324 bioRxiv:2018/04/16/301671
- [17] G. Micali<sup>‡</sup>, J. Grilli<sup>‡</sup>, J. Marchi, M. Osella, and M. Cosentino Lagomarsino. Dissecting the control mechanisms for DNA replication and cell division in *E. coli*. *Cell Reports*. 25,3:761-771.E4. 2018.  
doi:10.1016/j.celrep.2018.09.061 bioRxiv:2018/04/25/308155
- [18] J.N. Pruitt, A. Berdahl, C. Riehl, N. Pinter-Wollman, H.V. Moeller, E.G. Pringle, L.M. Aplin, E.J.H. Robinson, J. Grilli, P. Yeh, V.M. Savage, M.H. Price, J. Garland, I.C. Gilby, M. C. Crofoot, G.N. Doering, and E.A. Hobson. Social tipping points in animal societies. *Proceedings of the Royal Society B*. 285:20181282. 2018.  
doi:10.1098/rspb.2018.1282
- [19] T. Gibbs, J. Grilli, T. Rogers, and S. Allesina. The effect of population abundances on the stability of large random ecosystems. *Physical Review E*. 98, 022410. 2018.  
doi:10.1103/PhysRevE.98.022410 arXiv:1708.08837



- [20] C. Cadart, S. Monnier, J. Grilli, P.J. Sáez, N. Srivastava, R. Attia, E. Terriac, B. Baum, M. Cosentino Lagomarsino, and M. Piel. Size control in mammalian cells involves modulation of both growth rate and cell cycle duration. *Nature Communications*. 9:3275. 2018.  
doi:10.1038/s41467-018-05393-0 bioRxiv:2017/08/22/152728
- [21] J. Grilli, C. Cadart, G. Micali, M. Osella, and M. Cosentino Lagomarsino. The empirical fluctuation pattern of *E. coli* division control. *Frontiers in Microbiology*. 9, 1541. 2018.  
doi:0.3389/fmicb.2018.01541
- [22] A. Mazzolini, J. Grilli, E. De Lazzari, M. Osella, M. Cosentino Lagomarsino, and M. Gherardi. Zipf and Heaps laws from dependency structures in component systems. *Physical Review E*. 98, 012315. 2018.  
doi:10.1103/PhysRevE.98.012315 arXiv:1801.06438
- [23] C.A. Serván, J.A. Capitán, J. Grilli, K.E. Morrison, and S. Allesina. Coexistence of many species in random ecosystems. *Nature Ecology&Evolution*. 2, 12371242. 2018.  
doi:10.1038/s41559-018-0603-6 pmid:29988167
- [24] K. Jovic, M.G. Sterken, J. Grilli, R.P.J. Bevers, M. Rodriguez, J.A.G. Riksen, S. Allesina, J.E. Kammenga, L.B. Snoek. Temporal dynamics of gene expression in heat-stressed *Caenorhabditis elegans*. *Plos One*. 12(12), e0189445. 2017.  
doi:10.1371/journal.pone.0189445 bioRxiv:2017/05/16/135988
- [25] J. Grilli, G. Barabás, M. Michalska-Smith and S. Allesina. Higher-order interactions stabilize dynamics in competitive network models. *Nature*. 548, 210-213. 2017.  
doi:10.1038/nature23273
- [26] J. Grilli and S. Allesina. Last name analysis of mobility, gender imbalance, and nepotism across academic systems. *Proceedings of the National Academy of Sciences*. 114(29):7600-7605. 2017.  
doi:10.1073/pnas.1703513114
- [27] C. Tu, J. Grilli, F. Schuessler and S. Suweis. Collapse of resilience patterns in generalized Lotka-Volterra dynamics and beyond. *Physical Review E*. 95, 062307. 2017.  
doi:10.1103/PhysRevE.95.062307 arXiv:1606.09630
- [28] E. de Lazzari, J. Grilli, S. Maslov and M. Cosentino Lagomarsino. Family-specific scaling laws in bacterial genomes. *Nucleic Acids Research*. 45 (13): 7615-7622. 2017  
doi:10.1093/nar/gkx510 arXiv:1703.09822
- [29] J. Grilli, M. Osella, A.S. Kennard and M. Cosentino Lagomarsino. Relevant parameters in models of cell division control. *Physical Review E*. 95, 032411. 2017.  
doi:10.1103/PhysRevE.95.032411 arXiv:1606.09284
- [30] J. Grilli, M. Adorisio, S. Suweis, G. Barabás, J.R. Banavar, S. Allesina and A. Maritan. Feasibility and coexistence of large ecological communities. *Nature Communications*. 8:14389. 2017.  
doi:10.1038/ncomms14389 arXiv:1507.05337
- [31] S. Azaele, S. Suweis, J. Grilli, I. Volkov, J.R. Banavar, and A. Maritan. Statistical mechanics of ecological systems: neutral theory and beyond. *Review of Modern Physics*. 88, 035003. 2016.  
doi:10.1103/RevModPhys.88.035003 arXiv:1506.01721



- [32] [J. Grilli](#), T. Rogers and S. Allesina. Modularity and stability in ecological communities.  
*Nature Communications*. 7:12031. 2016.  
[doi:10.1038/ncomms12031](#)
- [33] J. Hidalgo, [J. Grilli](#), S. Suweis, A. Maritan and M.A. Muñoz. Cooperation, competition and the emergence of criticality in communities of adaptive systems.  
*Journal of Statistical Mechanics: Theory and Experiment*. 2016(3):033203. 2016.  
[doi:10.1088/1742-5468/2016/03/033203](#) [arXiv:1510.05941](#)
- [34] A.S. Kennard, M. Osella, A. Javer, [J. Grilli](#), P. Nghe, S. Tans, P. Cicuta and M. Cosentino Lagomarsino. Individuality and universality in the growth-division laws of single E. coli cells.  
*Physical Review E*. 93, 012408. 2016.  
[doi:10.1103/PhysRevE.93.012408](#) [arXiv:1411.4321](#)
- [35] S. Suweis, [J. Grilli](#), J.R. Banavar, S. Allesina and A. Maritan. Effect of localization on the stability of mutualistic ecological networks.  
*Nature Communications*. 6:10179. 2015.  
[doi:10.1038/ncomms10179](#)
- [36] S. Allesina, [J. Grilli](#), G. Barabás, S. Tang, J. Aljadeff and A. Maritan. Predicting the stability of large structured food webs.  
*Nature Communications*. 6:7842. 2015.  
[doi:10.1038/ncomms8842](#)
- [37] [J. Grilli](#), G. Barabás and S. Allesina. Metapopulation persistence in random fragmented landscapes. *Plos Computational Biology*. 11(5):e1004251. 2015.  
[doi:10.1371/journal.pcbi.1004251](#)
- [38] J. Hidalgo<sup>‡</sup>, [J. Grilli](#)<sup>‡</sup>, S. Suweis, M.A. Muñoz, J.R. Banavar and A. Maritan. Information-based fitness and the emergence of criticality in living systems.  
*Proceedings of the National Academy of Sciences*. 111(28):10095-10100. 2014.  
[doi:10.1073/pnas.1319166111](#) [arXiv:1307.4325](#)
- [39] [J. Grilli](#), M. Romano, F. Bassetti and M. Cosentino Lagomarsino. Cross-species gene-family fluctuations reveal the dynamics of horizontal transfers.  
*Nucleic Acids Research*. 42(11):6850-6860. 2014.  
[doi:10.1093/nar/gku378](#)
- [40] S. Suweis<sup>‡</sup>, [J. Grilli](#)<sup>‡</sup> and A. Maritan. Disentangling the effect of hybrid interactions and of the constant effort hypothesis on ecological community stability.  
*Oikos*. 123(5):525-532. 2014.  
[doi:10.1111/j.1600-0706.2013.00822.x](#) [arXiv:1301.1569](#)
- [41] [J. Grilli](#), S. Suweis and A. Maritan. Growth or reproduction: emergence of an evolutionary optimal strategy.  
*Journal of Statistical Mechanics: Theory and Experiment*. 2013(10):P10020. 2013.  
[doi:10.1088/1742-5468/2013/10/P10020](#) [arXiv:1306.5877](#)
- [42] [J. Grilli](#), S. Azaele, J.R. Banavar and A. Maritan. Absence of detailed balance in ecology.  
*Europhysics Letters*. 100:38002. 2012.  
[doi:10.1209/0295-5075/100/38002](#) [arXiv:1210.5819](#)
- [43] [J. Grilli](#), S. Azaele, J.R. Banavar and A. Maritan. Spatial aggregation and the species-area relationship across scales.  
*Journal of Theoretical Biology*. 313:87-97. 2012.  
[doi:10.1016/j.jtbi.2012.07.030](#) [pmid:22902426](#) [arXiv:1209.3591](#)

- [44] L. Grassi, J. Grilli and M. Cosentino Lagomarsino. Large-scale dynamics of horizontal transfers.  
*Mobile Genetics Elements*. 2(3):163-167. 2012.  
doi:10.4161/mge.21112 pmid:23061026
- [45] J. Grilli, B. Bassetti, S. Maslov and M. Cosentino Lagomarsino. Joint scaling laws in functional and evolutionary categories in prokaryotic genomes.  
*Nucleic Acids Research*. 40(2):530-540. 2012.  
doi:10.1093/nar/gkr711 pmid:21937509 arXiv:1101.5814

#### PREPRINTS

- [46] WR Shoemaker and J. Grilli. Macroecological patterns in coarse-grained microbial communities.  
bioRxiv:2023.03.02.530804
- [47] S Pompei, E Bella, J Weitz, J. Grilli, and M. Cosentino Lagomarsino. Metacommunity Structure Preserves Genome Diversity in the Presence of Gene-specific Selective Sweeps.  
bioRxiv:2023.01.17.524383
- [48] M. Sireci, M.A. Muñoz, and J. Grilli. A macroecological law links abundance correlations with phylogenetic similarity in microbiomes.  
bioRxiv:2022.07.12.499693
- [49] A. Mazzolini, and J. Grilli. Universality of evolutionary dynamics with arbitrary demography.  
bioRxiv:10.1101/2021.06.17.448795
- [50] L. Fant, I. Macocco, and J. Grilli. Eco-evolutionary dynamics lead to functionally robust and redundant communities.  
bioRxiv:10.1101/2021.04.02.438173
- [51] J. Grilli, M. Marsili, and G. Sanguinetti. Estimating the impact of preventive quarantine with reverse epidemiology.  
arXiv:1407.2425
- [52] M. Adorisio, J. Grilli, S. Suweis, S. Azaele, J.R. Banavar and A. Maritan. Spatial maximum entropy modeling from presence/absence tropical forest data.  
arXiv:1407.2425

‡ indicates equal contributions

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#### TEACHING EXPERIENCE

April-May 2020, 2021, 2022, 2023  
*Scientific Storytelling and Critical Thinking*. Diploma in Quantitative Life Science, ICTP (16 hours).

November-December 2020, 2021  
*Communication of epidemics*. (with R. Villa) Master in Comunicazione della Scienza, SISSA (10 hours).

October-December 2019, 2020, 2021, 2022  
*Introduction to Ecology and Evolution*. Diploma in Quantitative Life Science, ICTP and Master in Physics of Complex Systems (52 hours).

November 2017  
*Advanced topics in stochastic processes - Random Matrix Theory* (with A. Maritan & S. Suweis). Ph.D. School in Physics, Università degli Studi di Padova. (8 hours)

9 November 2017

Lecture on *neutral theory* during the class *An Introduction to Stochastic Processes in Continuous Time* (held by D. Alonso). Ph.D. program in Ecology&Evolution, University of Chicago. (2 hours)

October 2014

Introduction to Complex Systems (with S. Suweis). Master in Scientific Communication, Università degli Studi di Padova. (2 hours)

September 2014

*Tutor* at ESTAGE, internship for high-school students at Department of Physics and Astronomy, Università degli Studi di Padova. (8 hours)

November 2012 - June 2013

*Tutor Junior* at Università degli Studi di Padova

Mathematics (for 1st year Geology students), Mathematical Analysis and Linear Algebra (for 1st year Physics students).

SUPERVISION  
CURRENT

- W.R. Shoemaker, Postdoc 2022-, ICTP, Trieste, Italy.
- R. Crisostomo, Master Student, 2023-, QBio at U. of Montpellier, France
- X. Zhoum, Visiting Ph.D. Student, 2022-, HHU, China
- S. Golmohammadi, Ph.D. Student, 2019-present, IASBS, Iran and STEP Program, ICTP, Italy (with M. Zarei)

SUPERVISION PAST

- J. M. Camacho Mateu, Visiting Ph.D. Student 2023, Carlos III University of Madrid, Madrid, Spain.
- V. Monteiro Marquioni, Visiting Ph.D. Student 2022-2023, Universidade Estadual de Campinas, Campinas, Brazil.
- S. Lipani, M.Sc. Student 2022, University of Padova, Padova, Italy.
- M. Sireci, Ph.D. Student 2019-2023, University of Granada, Granada, Spain (with M.A. Munõz).
- M. Vasquez Ibarra, QLS Diploma Student 2021-2022, ICTP, Trieste, Italy.
- S. Farrag, QLS Diploma Student 2021-2022, ICTP, Trieste, Italy.
- S. Zaoli, Postdoc 2020-2022, ICTP, Trieste, Italy.
- L. Fant, Ph.D. Student 2019-2022, SISSA and ICTP, Trieste, Italy.
- A. Valsecchi, M.Sc. Student 2021-2022, University of Milan, Milan, Italy.
- A. Saleem, QLS Diploma Student 2020-2021, ICTP, Trieste, Italy.
- I. Rondon, QLS Diploma Student 2020-2021, ICTP, Trieste, Italy.
- M.H. Ming, MATH Diploma Student 2020-2021, ICTP, Trieste, Italy.
- M. Corigliano, M.Sc. Student 2020-2021, University of Milan, Milan, Italy.
- N. Dorilas, Research Experience for Undergraduates 2018, Santa Fe Institute, US (with A. Rominger).
- T. Gibbs, Undergraduate Student 2016-2017, Ecology & Evolution, Chicago, US (with S. Allesina).
- R. Satterwhite, Ph.D. Student (rotation) 2015, Ecology & Evolution, Chicago, US (with S. Allesina).

- M. Adorisio, M.Sc. in Physics 2014, Padova, Italy (with A. Maritan and S. Suweis).
- M. Insolia, B.Sc. in Physics 2014, Padova, Italy (with A. Maritan).
- E. De Lazzari, M.Sc. in Physics 2013, Padova, Italy (with A. Maritan and S. Suweis).

#### PH.D. PANELS AND COMMITTEES

- Malyon Bimler, Ph.D. in Ecology, University of Queensland, Australia (2020)
- Lana Descheemaeker, Ph.D. in Applied Physics, Vrije University of Brussels, Belgium (2020)
- Samuele Stivanello, Ph.D. in Mathematics, University of Padova, Italy (2021)
- Leonardo Miele, Ph.D. in Mathematics, University of Leeds, UK (2021)
- Rafael Menezes, Ph.D. program in Ecology, Universidade de São Paulo, Brazil (2021-)
- Francesco Camaglia, Ph.D. in Physics, LPENS, Paris, France (2023)

#### GRANTS, FELLOWSHIPS AND AWARDS

- July 2019  
[css/italy](#) young scientist award
- January 2018 to December 2019  
[Omidyar Fellowship](#), Santa Fe Institute.
- January 2014  
Fellowship sponsored by the Ing. Aldo Gini private foundation in Padua, funding a visit of 6 months at the University of Chicago [4.8k€].
- January 2012 to December 2014  
Three years fellowship for Ph.D. studies from [Università degli Studi di Padova](#).
- October 2011 to December 2011  
Post-master scholarship ‘ex 60%’ 2011.

#### HABILITATIONS

- August 8, 2018 to August 8, 2028  
[Italian National Scientific Habilitation](#) as Associate Professor in Theoretical Physics of Matter (ASN, 02/B2 II Fascia).
- September 12, 2018 to September 12, 2028  
[Italian National Scientific Habilitation](#) as Associate Professor in Applied Physics (ASN, 02/D1 II Fascia).
- October 8, 2018 to October 8, 2028  
[Italian National Scientific Habilitation](#) as Associate Professor in Ecology (ASN, 05/C1 II Fascia).

#### OTHER

Languages

Italian (native speaker), English (fluent) and Spanish (good)

Member of [American Physical Society](#) (2014,2018) Member of [Ecological Society of America](#) (2015), Member of [Complex System Society](#) (2013-2014),

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