Tiziano Squartini

Curriculum vitae et studiorum

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Education

19/12/2011 **PhD in Physics (XXIV cycle - Structure of Matter)**, *University of Siena*, IT.

04/07/2008 **Master's Degree in Experimental Physics**, *University of Siena*, IT, *110/110 CL*.

16/12/2005 **Bachelor's Degree in Physics and Advanced Technologies**, *University of Siena*, IT, *110/110 CL*.

10/07/2002 **Scientific High School Diploma**, *Liceo Scientifico Statale 'A. Volta'*, Colle Val d'Elsa, IT, *100/100*.

PhD thesis

Title *Information-theoretic approach to the analysis of complex networks.*

Supervisors M. I. Loffredo, D. Garlaschelli

Professional experiences

01/12/2021 present **Associate Professor in Theoretical Physics of Matter**, *IMT School for Advanced Studies Lucca - NETWORKS Research Unit (Coordinator: D. Garlaschelli)*, Lucca, IT.
https://networks.imtlucca.it/

01/12/2018 present **Assistant Professor in Theoretical Physics of Matter (Tenure Track, RTD-B)**, *IMT School for Advanced Studies Lucca - NETWORKS Research Unit (Coordinator: D. Garlaschelli)*, Lucca, IT.
https://networks.imtlucca.it/

01/11/2015 30/11/2018 **Assistant Professor in Theoretical Physics of Matter (RTD-A)**, *IMT School for Advanced Studies Lucca - NETWORKS Research Unit (Coordinator: G. Caldarelli)*, Lucca, IT.
https://networks.imtlucca.it/

01/01/2014 31/10/2015 **Postdoc Researcher**, *Institute for Complex Systems, 'Sapienza' University - PIL group (Supervisors: L. Pietronero, A. Gabrielli)*, Rome, IT.
http://www.sapienza.isc.cnr.it/

15/01/2012 31/12/2013 **Postdoc Researcher**, *Lorentz Institute for Theoretical Physics, University of Leiden - ENT group (Supervisor: D. Garlaschelli)*, Leiden, NL.

01/04/2011 30/06/2011 **Visiting Scientist**, *Lorentz Institute for Theoretical Physics, University of Leiden - ENT group (Supervisor: D. Garlaschelli)*, Leiden, NL.

01/11/2007 01/12/2007 **Intern**, *Center for the Study of Complex Systems (Supervisors: C. Mocenni, A. Facchini)*, Siena, IT.
Study of the effects of stochastic perturbations on a parametrically forced magnetic pendulum.
http://csc.unisi.it/

Teaching activities

2021/2022 present **Introduction to Network Science**, *IMT*, PhD course.
Syllabus: the course offers a panoramic view of network science, reviewing the main concepts and methods of this discipline by following its historical development.
https://www.imtlucca.it/sites/default/files/2021-2022-full-course-list.pdf

Advanced Concepts in Network Theory I and II, *IMT*, PhD course.
Syllabus: the first part of the course focuses on the topic of network reconstruction, the approaches that have been proposed to solve it and their differences; the second part of the course focuses on maximum-entropy models.
https://www.imtlucca.it/sites/default/files/2021-2022-full-course-list.pdf

2020/2021 **Advanced Methods for Complex Systems III**, *IMT*, PhD course.
Syllabus: the course focuses on the network reconstruction problem, the approaches that have been proposed to solve it and their differences.
https://www.imtlucca.it/sites/default/files/2020-2021-full-course-list.pdf

Advanced Topics in Network Theory: Research Topics, *IMT*, PhD course.
Syllabus: the course reviews pivotal articles in network theory, in order to provide PhD students with an overview of the most relevant literature in the field.
https://www.imtlucca.it/sites/default/files/2020-2021-full-course-list.pdf

Advanced Topics in Network Theory, *IMT*, PhD course within the Data Science joint doctorate.
Syllabus: the course provides an overview of both the analytical and the numerical techniques characterizing the statistical mechanics of networks.
http://datasciencephd.eu/courses

2019/2020 **Advanced Topics in Network Theory: Topological Concepts**, *IMT*, PhD course.
Syllabus: the course focuses on the description of methods for the detection of statistically significant mesoscale structures.

2018/2019 **Advanced Topics in Network Theory: Statistical Mechanics of Networks**, *IMT*, PhD course.
Syllabus: the course introduces the Exponential Random Graph formalism, a versatile tool for both testing hypotheses on networks and building models of them.

2017/2018 **Complex Networks for Data Science**, *IMT*, PhD course within the Data Science joint doctorate.
2019/2020 *Syllabus: the course focuses on the application of the methods characterizing the statistical mechanics of networks to data science.*

2016/2017 **Advanced Topics in Complex Networks**, *IMT*, PhD course.
Syllabus: community detection, network reconstruction and network validation, dynamical processes on networks.

2013/2014 **Complex Systems**, *Sapienza University*, Master course.
2014/2015

Lectures

2018/2019 **Big Data Analytics and Social Mining**, *University of Pisa*, Lecture, within the Master of the University
2020/2021 of Pisa, on techniques to randomize and reconstruct networks.
https://masterbigdata.it/

2020 **Data Science Colloquium. Statystical physics for real-world networks**, *IMT*, PhD lecture within the Data Science joint doctorate.
https://datasciencephd.eu/events/data-science-colloquium-2020

2019 **Data Science Colloquium. Financial networks reconstruction and systemic risk estimation**, *IMT*, PhD lecture within the Data Science joint doctorate.
https://datasciencephd.eu/events/data-science-colloquium-2019
https://www.youtube.com/watch?v=bYNI2Ufda98

2018 **Data Science Colloquium. Validating, reconstructing, predicting: a broad overview of network techniques**, *IMT*, PhD lecture within the Data Science joint doctorate.
https://datasciencephd.eu/events/validating-reconstructing-predicting-broad-overview-network-techniques

Supervising activities

2012 **Supervision of PhD/Master students**.
present
- @IMT: supervision of E. Agrimi (XXXVII cycle)
- @IMT: co-supervision of A. Gallo (XXXVII cycle)
- @IMT: co-supervision of F. Giuffrida (XXXVI cycle)
- @IMT: co-supervision of M. Di Vece (XXXIV cycle)
- @IMT: supervision of E. Marchese (XXXIII cycle)
  Alumni: F. Parisi, J. van Lidth de Jeude, N. Vallarano.

- @SNS: supervision of V. Pansanella (XXXVI cycle)
- @SNS: co-supervision of A. Gini (XXXV cycle)
- @SNS: co-supervision of L. Ialongo (XXXIV cycle)

Alumni: T. Radicioni.

- @SSSUP: co-supervision of S. M. Zema (XXXIV cycle)
- @UZH: co-supervision of J.-H. Lin (XXXIV cycle)
- @ISC: co-supervision of G. Bardella (Master thesis)
- @LION: supervision of Master/PhD students

Invited talks

2022 **Financial Computing and Analytics Group@UCL Seminar Series**
A network view of cryptocurrencies: the Bitcoin Lightning Network case-study
https://www.ucl.ac.uk/computer-science/research/research-groups/financial-computing-and-analytics/seminars
https://www.youtube.com/watch?v=SAT14ow_4ig

2021
- **CCC3/CCConf 2021. 3rd Berlin Conference on Crypto-Currencies in a Digital Economy**
A network view of cryptocurrencies: the Bitcoin Lightning Network case-study
https://ccconf.org/ccconf3-hp/
- **Blockchain and Cryptocurrency Complexity**
A network view of cryptocurrencies: the Bitcoin Lightning Network case-study
https://cref.it/en/blockchain-and-cryptocurrency-complexity/

2020
- **UZH Blockchain Center Lecture Series**
A network view of cryptocurrencies: the Bitcoin case-study
https://www.blockchain.uzh.ch/events/a-network-view-of-cryptocurrencies-the-bitcoin-case-study-lecture-series-fs2020/
https://www.youtube.com/watch?v=Bqp2O-IGoQk
- **Data Science in Techno-Socio-Economic Systems**
A network view of cryptocurrencies: the Bitcoin case-study
https://www.linkedin.com/pulse/june-10-11-2020-data-science-techno-socio-economic-systems-kolm?trk=read_related_article-card_title
- **Spring School: Complex Networks**
Maximum-entropy models for networks
https://www2.mathematik.tu-darmstadt.de/fbereiche/stochastik/SpringSchool2020/index.html

2018
- **Leiden Complex Networks Network (LCN2) Seminar Series**
Network ensembles
https://www.universiteitleiden.nl/en/events/2018/12/lcn2-seminar-network-ensembles
- **DPG Spring Meeting of the Condensed Matter Section (SKM) together with the EPS**
Maximum-entropy models in economics and finance
https://www.dpg-verhandlungen.de/year/2018/conference/berlin/part/soe/session/1
- **Second Conference on Financial Networks and Sustainability**
Statistical reconstruction of financial networks
https://www.finexus.uzh.ch/en/events/finexus2018-conference.html
https://www.youtube.com/watch?v=jR_raK6c1_c

2017
- **Community Detection and Network Reconstruction**
Network reconstruction techniques: an overview
https://www.eurandom.tue.nl/event/community-detection-and-network-reconstruction/#squartini
- **Statistical Physics for the Digital Economy**, satellite within **SigmaPhi 2017**
Maximum-entropy models for networks
http://www.sigmaphi.polito.it/index.php?option=com_content&view=article&id=93&Itemid=253
http://blockchain.cs.ucl.ac.uk/sigma-phi/

- **NETWORKS 2017**
  Maximum-entropy models for networks
  https://www.thenetworkcenter.nl/Events/Upcoming-events/event/104/NETWORKS-2017-Scientific-Conference
- **Think Tank on Financial Complexity**
  Networks reconstruction: applications from economics and finance
  http://ias.uva.nl/content/events/events/2017/06/financial-complexity.html
- **First Conference on Financial Networks and Sustainability**
  Reconstructing economic and financial networks
  https://www.finexus.uzh.ch/en/events/finexus2017-conference.html

2016
- **Towards a Sustainable Global Financial System**
  Statistical validation of economic and financial networks
  https://sites.google.com/site/systemscienceandpolicy/
- **Complex networks: from socio-economic systems to biology and brain**
  Networks reconstruction: applications from economics and finance
  http://lipari.cs.unict.it/LipariSchool/SECS16/

2015 **Brain networks**, satellite within **NetSci 2015**
Detecting cluster structure of resting state fMRI brain networks of mice
http://s512731021.mialojamiento.es/netsci2015brain/

2014 **CFE 2014. 8th International Conference on Computational and Financial Econometrics**
Early-warning signals of topological collapse in interbank networks
http://www.cfenetwork.org/CFE2014/fullprogramme.php

2013
- **Complex Networks and Climate. Research and scientific software**
  Financial Complex Networks
  http://www.vortech.nl/fileadmin/filelist/pdf-bestanden/Vortech-IMAU_workshop_program.pdf
- **Econophysics and Networks Across Scales**
  Stationary and non-stationary behavior of meso-scale and macro-scale networks
  http://www.lorentzcenter.nl/lc/web/2013/566/program.pdf

2012 **Econophys-Kolkata VII**
Precursors of the financial crisis in the Dutch Interbank Network
http://www.saha.ac.in/cmp/epkol.Vii/schedule.pdf

Contributed talks

2021
- **Networks 2021**
  Generalized inference for the efficient reconstruction of weighted networks
  https://networks2021.net/
- **I Conference of the Italian Society of Statistical Physics - SIFS**
  Generalized inference for the efficient reconstruction of weighted networks
  http://www.fisicastatistica.unipr.it/conf/PARMA2021/welcome.php
  https://www.youtube.com/watch?v=9WI4P–wD0A

2020 **NetSci 2020**
- *Generalized inference for the efficient reconstruction of weighted networks*
- *Breaking of ensemble equivalence in networks*

https://netsci2020.netscisociety.net/

2019
- **Complex Networks 2019**
  - *Detecting mesoscale network structures*
  - *A faster horse on a safer trail: generalized inference for the efficient reconstruction of weighted networks*

  https://www.2019.complexnetworks.org/program
- **XXIV National Conference on Statistical Physics and Complex Systems**
  Detecting mesoscale network structures
  http://www.fisicastatistica.unipr.it/conf/PARMA2019/welcome.php
- **Big Data and Economic Forecasting 2019**
  Detecting mesoscale network structures
  https://ec.europa.eu/jrc/communities/sites/jrccties/files/agenda_big_data_workshop2019_3.pdf

2018
- **CFE 2018. 12th International Conference on Computational and Financial Econometrics**
  Maximum-entropy models in economics and finance
  http://www.cfenetwork.org/CFE2018/programme.php
- **Leiden Complex Networks Network (LCN2) seminar**
  Network ensembles
  https://www.universiteitleiden.nl/en/events/2018/12/lcn2-seminar-network-ensembles
- **XXIII National Conference on Statistical Physics and Complex Systems**
  Entropy-based approach to missing-links prediction
  http://www.fisicastatistica.unipr.it/conf/PARMA2018/welcome.php

2017
- **SigmaPhi 2017**
  Inferring monopartite projections of bipartite networks: an entropy-based approach
  http://www.sigmaphi.polito.it/index.php?option=com_content&view=article&id=75&Itemid=255

2016
- **CCS 2016**
  - *Detecting the bipartite World Trade Web evolution across 2007: a motifs-based analysis* (talk)
  - *Financial network reconstruction via fitness-induced maximum entropy* (ignite talk at the satellite **Financial Networks and Policy Applications: from Systemic Risk to Sustainability**)
  - *Estimating topological properties of weighted networks from limited information: applications to socio-economic field* (poster)

  http://www.ccs2016.org/
  http://www.dolfinsproject.eu/index.php/ccs16
- **General Mathematics Colloquium**
  Networks reconstruction: applications from economics and finance
  http://kdvi.uva.nl/research/colloquia/general-mathematics-colloquium.html
- **CompleNet 2016. 7th Workshop on Complex Networks**
  Detecting the bipartite World Trade Web evolution across 2007: a motifs-based analysis
  http://complenet.org/CompleNet_2016/Program_files/Program_detailed_oral%20%281%29.pdf

2015
- **XX Convegno Nazionale di Fisica Statistica e dei Sistemi Complessi**
  Detecting cluster structure of resting state fMRI brain networks of mice
  http://www.fisicastatistica.unipr.it/conf/PARMA2015/welcome.htm
- **NetSci 2015**
  - *Estimating topological properties of weighted networks from limited information* (poster)
  - *Randomizing bipartite networks: the case of the World Trade Web* (poster)

  http://netsci2015.net/images/site/booklet_NetSci2015_web.pdf
- **IWcee15**
  A GDP-driven model for the binary and weighted structure of the International Trade Network
  http://www.ircres.cnr.it/index.php/it/iwcee15

2014 **ECCS 2014**
- *Bootstrapping topological properties of complex economic networks* (talk)
- *Nonconformism in the voter model: Watts-Strogatz VS scale-free networks* (poster)

http://www.eccs14.eu/images/IMT/eccs14_programme020714.pdf

2013
- **ECCS 2013**
  Early-warning signals of topological collapse in interbank networks
  http://www.eccs13.eu/index.php/program
- **NetSci 2013**
  Early-warning signals of the financial crisis in the Dutch Interbank Network
  http://netsci2013.net/wordpress/wp-content/uploads/2013/05/schedule_NetSci2013_detail.pdf

2012
- **SITIS 2012. 8th International Conference on Signal Image Technology & Internet Based Systems**
  The role of distances in the World Trade Web
  http://www.computer.org/csdl/proceedings/sitis/2012/4911/00/index.html
- **DPG 2012. 76th Annual Meeting of the DPG and DPG Spring Meeting**
  The informativeness of local constraints in the structure of the global trade network
  http://www.dpg-verhandlungen.de/year/2012/conference/berlin/part/soe/session/12/contribution/7
- **IWSOS 2012. 6th International Workshop on Self-Organizing Systems**
  Triadic motifs and dyadic self-organization in the World Trade Network
  http://iwsos2012.ewi.tudelft.nl/?page_id=65/

2009
- **Darwin Bicentenary - Evolution: Intersecting Natural and Social Sciences**
  Statistical physics for biological networks
  http://www.unisi.it/eventi/darwin/
- **Trade NetWorkshop 2.0**
  Exact method for randomizing real networks - Application to the WTW
  https://sites.google.com/site/tradenetit/
- **BioPhys 09 - Biology and beyond**
  Statistical physics for biological networks - Exact method to randomize real networks
  http://www.cnr.it/eventi/index/evento/id/12175
- **NetSci 2009**
  Exact method for randomizing real networks
  http://www.netsci09.net/Programme.pdf

Training courses

2021 **Internet Festival 2021**
Capire il presente attraverso i social network (with A. Patuelli, T. Radicioni, F. Saracco)
https://www.internetfestival.it/en/programma/capire-il-presente-attraverso-i-social-network/

Divulgative talks

2018 **Accade d'inverno. L'altra stagione di San Gimignano**
Connessi: un mondo di reti
http://www.asfer.it/presentazioni/item/38286-connessi-un-mondo-di-reti-presentazione-di-un-opera-di-eccezionale-valore
https://www.comune.sangimignano.si.it/it/allegati-ecc/pieghevoleinverno2018.pdf

Organized events

2020
- (with P. Barucca, C. Davis, J. Feng, N. Masuda, A. Nematzadeh, F. Saracco) **Complexity Meets Finance: Data, Methods and Policy Implications** (satellite within NetSci 2020)
  https://sites.google.com/view/cmf20/home
- [postponed due to Covid-19]
  (with R. Livi, P. Politi, F. Saracco) **First School of the Italian Statistical Physics Society**
  https://sifsschool2020.imtlucca.it/
  https://www.sicastatistica.org/scuola-di-alta-formazione-sifs

2019
(with A. Antonioni, R. Mastrandrea, E. Valdano) **Complexity72h**
https://complexity72h.weebly.com/2018.html

2018
- (with I. Bordino, G. Caldarelli, F. Fumarola, F. Gullo) **MIDAS. The Third Workshop on MIning DAta for financial applicationS** (satellite within ECML-PKDD 2018)
  http://www.ecmlpkdd2018.org/workshops/
  https://sites.google.com/a/imtlucca.it/networks—imt-unit-for-the-study-of-networks/conferences/midas2018
- (with P. Barucca, G. Caldarelli, G. Cimini) **3rd Workshop on Statistical Physics for Financial and Economic Networks** (satellite within NetSci 2018)
  https://netsci2018.wixsite.com/netsci2018/satellites
  https://sites.google.com/imtlucca.it/spfen3-netsci2018/home
- (with A. Antonioni, G. Caldarelli, E. Valdano) **Complexity72h**
  https://complexity72h.weebly.com/2018.html

2017
- (with I. Bordino, G. Caldarelli, F. Fumarola, F. Gullo) **MIDAS. The Second Workshop on MIning DAta for financial applicationS** (satellite within ECML-PKDD 2017)
  http://ecmlpkdd2017.ijs.si/program.html
  https://sites.google.com/a/imtlucca.it/networks—imt-unit-for-the-study-of-networks/conferences/midas2017
- (with P. Barucca, G. Caldarelli, G. Cimini, Y. Gandica) **2nd Workshop on Statistical Physics for Financial and Economic Networks** (satellite within NetSci 2017)
  http://netsci2017.net/
  https://2ndworkshopstatphysicfinancialeconomicnetworks.wordpress.com/

2016
- (with I. Bordino, G. Caldarelli, F. Fumarola, F. Gullo) **MIDAS. The First Workshop on MIning DAta for financial applicationS** (satellite within ECML-PKDD 2016)
  http://www.ecmlpkdd2016.org/
  https://sites.google.com/a/imtlucca.it/networks—imt-unit-for-the-study-of-networks/conferences/midas
- (with S. Battiston, G. Caldarelli, G. Cimini, A. Mandel) **Statistical Physics of Financial and Economic Networks** (satellite within StatPhys26)
  http://statphys26.sciencesconf.org/resource/page/id/10
  https://sites.google.com/a/imtlucca.it/statphys-spfen/home

2014
- (with S. Galam, M. A. Javarone) **SEDNAM - Socio-Economic Dynamics: Networks and Agent-based Models** (satellite within SocInfo 2014)
  http://socinfo2014.org/workshops/
  http://www.sednam.eu
- (with S. Galam, M. A. Javarone) **SEDPAM - Socio-Economic Dynamics: Physics-based Agent Models. Beyond the representative agent paradigm** (satellite within ECCS 2014)
  http://www.eccs14.eu/images/IMT/eccs14_programme020714.pdf
  http://www.sedpam.eu/sedpam_poster.pdf

Scientific publications

2021
- M. Mattei, G. Caldarelli, T. Squartini, F. Saracco, **Italian Twitter semantic network during the Covid-19 epidemic**, *EPJ Data Science* **10 (47)** (2021).
  https://epjdatascience.springeropen.com/articles/10.1140/epjds/s13688-021-00301-x
- T. Radicioni, T. Squartini, E. Pavan, F. Saracco, **Networked partisanship and framing: a socio-semantic network analysis of the Italian debate on migration**, *PLoS ONE* **16 (8)**, e0256705 (2021).
  https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0256705
- G. Cimini, R. Mastrandrea, T. Squartini, **Reconstructing networks**, in *The structure and dynamics of complex networks*, Cambridge Elements series, Cambridge University Press (edited by G. Caldarelli) (2021).
  https://www.cambridge.org/core/elements/abs/reconstructing-networks/7EDEBB87A0A277B65FE6297F553CCB3F
- N. Vallarano, M. Bruno, E. Marchese, G. Trapani, F. Saracco, G. Cimini, M. Zanon, T. Squartini, **Fast and scalable likelihood maximization for Exponential Random Graph Models with local constraints**, *Sci. Rep.* **11 (15227)** (2021).
  https://www.nature.com/articles/s41598-021-93830-4
  Python code at: https://pypi.org/project/NEMtropy/
- T. Radicioni, F. Saracco, E. Pavan, T. Squartini, **Analysing Twitter semantic networks: the case of 2018 Italian elections**, *Sci. Rep.* **11 (13207)** (2021).
  https://www.nature.com/articles/s41598-021-92337-2
- M. Bardoscia, P. Barucca, S. Battiston, F. Caccioli, G. Cimini, D. Garlaschelli, F. Saracco, T. Squartini, G. Caldarelli, **The physics of financial networks**, *Nat. Rev. Phys.* **3**, pp. 490-507 (2021).
  https://www.nature.com/articles/s42254-021-00322-5
- I. Anagnostou, T. Squartini, D. Garlaschelli, D. Kandhai, **Uncovering the mesoscale structure of the credit default swap market to improve portfolio risk modelling**, *Quant. Finance*, **1890807** (2021).
  https://doi.org/10.1080/14697688.2021.1890807

2020
- N. Vallarano, C. J. Tessone, T. Squartini, **Bitcoin Transaction Networks: an overview of recent results**, *Front. Phys.*, **8**, 286 (2020).
  https://www.frontiersin.org/articles/10.3389/fphy.2020.00286/abstract
- F. Parisi, T. Squartini, D. Garlaschelli, **A faster horse on a safer trail: generalized inference for the efficient reconstruction of weighted networks**, *New J. Phys.* **22**, 053053 (2020).
  https://iopscience.iop.org/article/10.1088/1367-2630/ab74a7
- J.-H. Lin, K. Primicerio, T. Squartini, C. Decker, C. J. Tessone, **Lightning Network: a second path towards centralisation of the Bitcoin economy**, *New J. Phys.* **22**, 083022 (2020).
  https://iopscience.iop.org/article/10.1088/1367-2630/aba062

2019
- J. van Lidth de Jeude, G. Caldarelli, T. Squartini, **Detecting core-periphery structures by surprise**, *Europhys. Lett.* **125 (6)**, 68001 (2019).
  https://doi.org/10.1209/0295-5075/125/68001
- J. van Lidth de Jeude, R. Di Clemente, G. Caldarelli, F. Saracco, T. Squartini, **Reconstructing mesoscale network structures**, *Complexity* **5120581** (2019).
  https://doi.org/10.1155/2019/5120581
- G. Cimini, T. Squartini, F. Saracco, D. Garlaschelli, A. Gabrielli, G. Caldarelli, **The statistical physics of real-world networks**, *Nat. Rev. Phys.* **1 (1)**, pp. 58-71 (2019).
  https://www.nature.com/articles/s42254-018-0002-6

2018
- T. Squartini, D. Garlaschelli, **Maximum-entropy networks. Pattern detection, network reconstruction and graph combinatorics**, SpringerBriefs in Complexity, Springer (2018).
  https://link.springer.com/book/10.1007/978-3-319-69438-2
- M. Bruno, F. Saracco, T. Squartini, M. Duenas, **Colombian export capabilities: building the firms-products network**, *Entropy* **20 (10)** (2018).
  https://www.mdpi.com/1099-4300/20/10/785/html

- F. Parisi, G. Caldarelli, T. Squartini, **Entropy-based approach to missing-links prediction**, *Appl. Netw. Sci.* **3 (1)** (2018).
  https://link.springer.com/article/10.1007/s41109-018-0073-4
- P. Barucca, G. Caldarelli, T. Squartini, **Tackling information asymmetry in networks: a new entropy-based ranking index**, *J. Stat. Phys.* **173 (3)**, pp. 1028–1044 (2018).
  https://link.springer.com/article/10.1007/s10955-018-2076-z
- M. J. Straka, G. Caldarelli, T. Squartini, F. Saracco, **From Ecology to Finance (and Back?): A Review on Entropy-Based Null Models for the Analysis of Bipartite Networks**, *J. Stat. Phys.* **173 (3)**, pp. 1252–1285 (2018).
  https://link.springer.com/article/10.1007/s10955-018-2039-4
- T. Squartini, G. Caldarelli, G. Cimini, A. Gabrielli, D. Garlaschelli, **Reconstruction methods for networks: the case of economic and financial systems**, *Phys. Rep.* **757**, pp. 1-47 (2018).
  https://www.sciencedirect.com/science/article/pii/S0370157318301509

2017
- T. Squartini, A. Almog, G. Caldarelli, I. van Lelyveld, D. Garlaschelli, G. Cimini, **Enhanced capital-asset pricing model for the reconstruction of bipartite financial networks**, *Phys. Rev. E* **96 (3)**, 032315 (2017).
  https://journals.aps.org/pre/abstract/10.1103/PhysRevE.96.032315
- F. Saracco, M. J. Straka, R. Di Clemente, A. Gabrielli, G. Caldarelli, T. Squartini, **Inferring monopartite projections of bipartite networks: an entropy-based approach**, *New J. Phys.* **19**, 053022 (2017).
  https://iopscience.iop.org/article/10.1088/1367-2630/aa6b38
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J. Li, C. Chen, T. Squartini, Q. He, **A study on wear resistance and microcrack of the Ti_3Al/TiAl+TiC ceramic layer deposited by laser cladding on Ti-6Al-4 V alloy**, *Applied Surface Science* **257 (05)**, pp. 1550-1555 (2010).
http://www.sciencedirect.com/science/article/pii/S0169433210011724

2009
T. Squartini, **Weighted Random Graph** (2009).
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2007
T. Squartini, **Neural networks: a review**, *Nuovo Cimento C* **030 (03)**, pp. 243-253 (2007).
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submitted books
- G. Fagiolo, D. Garlaschelli, M. Riccaboni, T. Squartini, **International Economic Networks: The Global Structure of Trade, Production, Finance and Migration**, Cambridge University Press (2021).

submitted papers

- S. M. Zema, G. Fagiolo, T. Squartini, D. Garlaschelli, **Mesoscopic structure of the stock market and portfolio optimization**, LEM Working Paper Series 2021/45, *under submission* (2021).
- L. N. Ialongo, C. de Valk, E. Marchese, F. Jansen, H. Zmarrou, T. Squartini, D. Garlaschelli, **Reconstructing firm-level interactions: the Dutch input-output network**, arXiv:2111.15248, *under submission* (2021).
- J.-H. Lin, E. Marchese, C. J. Tessone, T. Squartini, **The weighted Bitcoin Lightning Network**, arXiv:2111.13494, *under submission* (2021).
- M. Di Vece, D. Garlaschelli, T. Squartini, **Gravity models of networks: integrating maximum-entropy and econometric approaches**, arXiv:2107.02650, *under submission* (2021).
- E. Marchese, G. Caldarelli, T. Squartini, **Detecting mesoscale structures by surprise**, arXiv:2106.05055, *accepted for publication on Communications Physics* (2021).
- A. Bovet, C. Campajola, F. Mottes, V. Restocchi, N. Vallarano, T. Squartini, C. J. Tessone, **The evolving liaisons between the transaction networks of Bitcoin and its price dynamics**, arXiv:1907.03577, *under submission* (2021).
- A. Bovet, C. Campajola, J. F. Lazo, F. Mottes, I. Pozzana, V. Restocchi, P. Saggese, N. Vallarano, T. Squartini, C. J. Tessone, **Network-based indicators of Bitcoin bubbles**, arXiv:1805.04460, *under submission* (2021).
- T. Squartini, D. Garlaschelli, **Reconnecting statistical physics and combinatorics beyond ensemble equivalence**, arXiv:1710.11422, *under submission* (2021).
- T. Squartini, **Algebraic characterization of binary graphs**, arXiv:1209.5565, *under submission* (2021).

Divulgative publications

2021 T. Squartini, **Meccanica statistica per reti complesse**, *Ithaca: Viaggio nella Scienza*, **17 B** (2021).
http://ithaca.unisalento.it/nr-17bis_2021/articolo_IIp_04-bis.pdf

Reviewing activity

2011 – present **Referee**.
Chaos: An Interdisciplinary Journal of Nonlinear Science, *Complexity*, *Entropy*, *EPJ Data Science*, *Europhysics Letters*, *IEEE Transactions on Network Science and Engineering*, *Journal of Complex Networks*, *Journal of Economic Interaction and Coordination*, *Journal of Network Theory in Finance*, *Journal of Risk and Financial Management*, *Journal of Statistical Physics*, *Nature Communications*, *Online Social Networks and Media*, *Physica A*, *Physical Review E*, *Physical Review Letters*, *Quality & Quantity*, *Scientific Reports*, *Symmetry*, *The European Physical Journal B*, *The Journal of Statistical Mechanics: Theory and Experiment*, *Transactions on Modeling and Computer Simulation*.
https://publons.com/author/633896/tiziano-squartini#profile

Editorial activity

2020 – present **Blockchain Economics (section: Frontiers in Blockchain)**, *Review Editor*.
https://www.frontiersin.org/journals/blockchain

Interdisciplinary Physics (section: Frontiers in Physics), *Review Editor*.
https://www.frontiersin.org/journals/physics

2018 **Proceedings of the 3rd Workshop on MIning DAta for financial applicationS (MIDAS 2018)**, *Editor (with I. Bordino, G. Caldarelli, F. Fumarola, F. Gullo)*.
https://www.springer.com/kr/book/9783030134624

2017 **Proceedings of the 2nd Workshop on MIning DAta for financial applicationS (MIDAS 2017)**, *Editor (with I. Bordino, G. Caldarelli, F. Fumarola, F. Gullo)*.
http://ceur-ws.org/Vol-1941/MIDAS2017_preface.pdf

2016 **Proceedings of the 1st Workshop on MIning DAta for financial applicationS (MIDAS 2016)**, *Editor (with I. Bordino, G. Caldarelli, F. Fumarola, F. Gullo)*.
http://ceur-ws.org/Vol-1774/MIDAS2016_preface.pdf

2017 present **Scientific Reports (section: Mathematical Physics, Thermodynamics and Nonlinear Dynamics)**, *Editorial Board Member*.
http://www.nature.com/srep/about/editorial-board#mathematicalphysics

Fellowships and membership in societies

2020 present **Institute for Advanced Study (IAS - University of Amsterdam)**, *Fellow*.
https://ias.uva.nl/people/fellows/current-fellows/squartini-tiziano.html

2019 present **Società Italiana di Fisica Statistica (SIFS)**, *Member*.
https://www.fisicastatistica.org/

Società Italiana di Fisica (SIF), *Member*.
https://www.sif.it/

2017 2020 **Complex Systems Society**, *Council Member*.
https://cssociety.org/about-us/council

Membership in academic bodies

2021/2022 present **'Data Science and Statistical Learning' second level master**, *Organizing Committee Member*.
https://md2sl.imtlucca.it/

2021/2022 present **'Artificial Intelligence' national doctorate (pillar: AI & Society)**, *PhD Board Member*.
https://www.phd-ai.it/en/359-2/

2017/2018 2020/2021 **'Data Science' joint doctorate**, *PhD Board Member*.
https://www.phd-ai.it/en/ai-society/

2018-2019 **IMT School for Advanced Studies Lucca**, *Member of the Academic Senate as a representative of researchers*.

Mentions, awards and honors

2021 Best poster award, for the works *Generalized inference for the efficient reconstruction of weighted networks* (within the 'Information Theory, Probability and Statistics' section) and *Breaking of ensemble equivalence in networks* (within the 'Statistical Physics' section) presented at Entropy 2021 (online conference).
https://entropy2021.sciforum.net/
https://sciforum.net/paper/view/9759
https://sciforum.net/paper/view/9780

2018 National Scientific Qualification (Abilitazione Scientifica Nazionale) for Associate Professorship in:
- 09/2018 - **FIS 02/D1** (Fisica Applicata, Didattica e Storia della Fisica)
- 08/2018 - **FIS 02/B2** (Fisica Teorica della Materia)
- 08/2018 - **FIS 02/A2** (Fisica Teorica delle Interazioni Fondamentali)

2017 As a result of four horseraces among several reconstruction algorithms, the method proposed in the paper *Systemic risk analysis in reconstructed economic and financial networks* has been found to perform best among the probabilistic algorithms:
- *K. Anand et al., J. Financial Stability 35, 107-119 (2017)*
  https://www.sciencedirect.com/science/article/pii/S1572308917303649
- *P. Mazzarisi, F. Lillo, in Econophysics and Sociophysics: Recent Progress and Future Directions, Springer (2017)*
  https://link.springer.com/chapter/10.1007%2F978-3-319-47705-3_15
- *A. Ramadiah, F. Caccioli, D. Fricke, ESRB Working Paper Series No 84 (2018)*
  https://www.esrb.europa.eu/pub/pdf/wp/esrb.wp84.en.pdf?9a192a619652638e87c064054673aa2b
- *M. Lebacher, S. Cook, N. Klein, G. Kauermann, arXiv:1909.01274 (2019)*
  https://arxiv.org/pdf/1909.01274.pdf

2012 Best paper award (plus cash prize), for the work *Triadic motifs and dyadic self-organization in the World Trade Network* presented at IWSOS 2012, Delft (NL), awarded by International Federation for Information Processing (IFIP).

2011 The paper *Analytical maximum-likelihood method to detect patterns in real networks*, published on the New Journal of Physics, was downloaded 250 times. This was achieved in 13 days from the date of publication (across all IOP journals 10% of articles were accessed over 250 times that quarter, as notified by the editorial board).

press coverage (publications)

https://www.scienzainrete.it/articolo/fisica-delle-reti-finanziarie-intervista-guido-caldarelli/chiara-sabelli/2021-07-02
http://www.sobigdata.eu/newsletter
https://www.eurekalert.org/news-releases/622793
https://www.luccaindiretta.it/cultura-e-spettacoli/2021/06/15/i-mercati-finanziari-si-possono-prevedere-con-la-fisica-parola-di-imt/240491/
https://www.eurekalert.org/pub_releases/2021-06/isfa-wpm060921.php
https://mp.weixin.qq.com/s/bYOzmrUgQy_PUD_so8sK7w
https://www.networkpages.nl/financial-networks-a-complete-overview-of-interbank-exchanges-would-help-prevent-a-new-financial-collapse/
https://www.youtube.com/watch?v=MevkCj2H1Qg
https://cointelegraph.com/news/bitcoins-lightning-network-found-more-centralized-than-expected-by-researchers
https://www.coindesk.com/bitcoins-lightning-network-is-growing-increasingly-centralized-researchers-find
https://phys.org/news/2019-01-common-complex-physics-economics.html
http://www.mejudice.nl/artikelen/detail/complexe-lessen-voor-bankiers-en-toezichthouders
https://www.universiteitleiden.nl/en/news/2017/06/leiden-econophysics-model-tested-best-by-central-banks
https://www.universiteitleiden.nl/en/news/2016/03/century-old-physics-assumption-proven-wrong
https://www.universiteitleiden.nl/en/news/2016/02/complexity-models-to-prevent-financial-crashes-like-2008
http://www.isigrowth.eu/wp-content/uploads/2016/05/battiston2016complexity.pdf
https://issuu.com/universiteit-leiden/docs/trots_2013
http://citec.repec.org/s/2013/sprjeicoo.html

press coverage (scientific events)

https://www.lagazzettadilucca.it/cultura-e-spettacolo/2019/06/complexity-72h-alla-scuola-imt-una-maratona-dellaricerca/
https://www.luccaindiretta.it/dalla-citta/2019/06/17/via-alla-maratona-della-ricerca-alla-scuola-imt-lucca/144673/
http://iltirreno.gelocal.it/lucca/cronaca/2018/05/08/news/workshop-sperimentale-a-imt-1.16810334
https://www.lagazzettadilucca.it/cultura-e-spettacolo/2018/05/complexity72h-alla-scuola-imt-un-incontro-tra-studiosi-di-vari-settori-per-tre-giorni-di-ricerca-nel-segno-dellinterdisciplinarieta/

Lucca, Italy, 11/02/2022

Tiziano Squartini