

Curriculum Vitae - Dr. Manuel Sebastian Mariani

Contact Information

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Statistics, from 2015 to 29/2/2019:

Published papers: 17
Total Citations (Google Scholar): 174

(Status: February 2019)

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Short Profile

Manuel Sebastian Mariani has been Senior Research Associate at the University Research Priority Program (URPP) on Social Networks since November 2017, and Research Associate Professor at the University of Electronic Science and Technology of China (UESTC) since September 2017. He is mostly interested in measuring, predicting and potentially engineer success in socio-economic and information systems. His research has focused on ranking metrics for success in complex networks, the early-identification of seminal papers and patents, and the identification of influential nodes that can trigger large-scale cascades of adoptions in social networks. More recently, in collaboration with marketing companies, he has been interested in the identification of key individuals whose behavior can be used to predict the eventual success of a recent innovation. He has also been interested in the development of new methodologies for the detection of structural patterns (e.g., nestedness and community structure) in complex networks. Manuel S. M. combines methodologies from network science, statistical physics, and statistical learning.

Manuel S. M. has published several articles on both interdisciplinary journals (*PNAS* and *Scientific Reports*) and journals from specific disciplines, including physics (*Physics Reports* and *Physical Review E*, among others), information science (*Information Sciences*, *Journal of Informetrics*), and technological forecasting (*Technological Forecasting and Social Change*). He has delivered talks at important conferences in network science (*NetSci*, *NetSciX*) and complexity science (*Conference on Complex Systems*), and he has co-organized two editions of the *Swiss Symposium on Network Science* (local chapter of the Network Science Society; March and October 2018). He has been reviewer for prestigious journals, including *Research Policy* and *Journal of Informetrics*.

Research focus: network science, social networks, innovation diffusion, success prediction.

Methodological focus: network analysis, diffusion models, stochastic processes, statistical learning.

Education

- 12/2013–10/2017 UNIVERSITY OF FRIBOURG, SWITZERLAND, **Doctorate** in Physics.
Title of dissertation: *The temporal dimension of ranking in complex networks: algorithms, models, and applications*. Thesis supervisor: Prof. Yi-Cheng Zhang.
- 09/2011–07/2013 UNIVERSITY SAPIENZA OF ROME, ITALY, **M. Sc. Degree** in Physics.
Title of dissertation: *Effects of variations of density on out-of-equilibrium glasses*. The thesis work led to my subsequent publication PNAS 112.8: 2361–2366 (2015). Thesis supervisor: Prof. Giorgio Parisi. Focus of my studies: theoretical physics, statistical mechanics. Selected for the “excellence program” for the top-30 students.
- 09/2008–09/2011 UNIVERSITY SAPIENZA OF ROME, ITALY, **B. Sc. Degree** in Physics.
Title of dissertation: *Quantum entanglement: consequences and applications*. Thesis supervisor: Prof. Massimo Testa. Selected for the “excellence program” for the top-30 students.

Academic and Professional Experience

- 11/2017–present UNIVERSITY OF ZURICH, SWITZERLAND, Senior Research Associate at the University Research Priority Program “Social Networks”.
- 09/2017–present UNIVERSITY OF ELECTRONIC SCIENCE AND TECHNOLOGY OF CHINA, CHINA, Research Associate Professor in Physics at the Institute of Fundamental and Frontier Sciences.
- 01/2016–07/2017 SHENZHEN UNIVERSITY, CHINA, Visiting senior researcher at the Guangdong Province Key Laboratory of Popular High Performance Computers, College of Computer Science and Software Engineering.

Awards

- 2017 Manuel Sebastian Mariani received the EPS Young Researcher Grant which supported his participation in the SigmaPhi 2017 conference.
- 2013 Manuel Sebastian Mariani was selected among the top 30 master students in physics at University Sapienza of Rome to participate in the excellence program.
- 2011 Manuel Sebastian Mariani was selected among the top 30 bachelor students in physics at University Sapienza of Rome to participate in the excellence program.

Research Grants, Scholarships and Third Party Funding

- 2019-2020 Swiss National Science Foundation (SNSF) grant for “Influencer and Innovator Identification in Temporal Networks”, research project: Co-investigator and Main postdoctoral fellow. (348'169 CHF).
- 2019-2020 UESTC professor research start-up grant. (17'500 CHF)
- 2014-2017 The Swiss National Science Foundation (SNSF) grant “Node heterogeneity and temporal patterns in growing complex networks” partially supported my PhD position. I contributed by writing part of the proposal and project reports (292'305 CHF).
- 2013-2016 The EU FET-Open Grant “GROWTHCOM” partially supported my PhD position. I contributed by writing project reports.

Publications

[(*) marks the papers where I am corresponding author]

Peer-reviewed articles (17)

- (17) (*) M. S. Mariani, Z.-M. Ren, J. Bascompte, C. J. Tessone, *Nestedness in complex networks: observation, emergence, and implications*, to appear in *Physics Reports* (2019).
- (16) (*) H. Liao, M.-K. Liu, M. S. Mariani, M. Zhou, X. Wu, *Temporal similarity metrics for latent network reconstruction: The role of time-lag decay*, to appear in *Information Sciences* (2019).
- (15) (*) F. Zhou, L. Lu, M. S. Mariani, *Fast influencers in complex networks*, To appear in *Communications in Nonlinear Science and Numerical Simulation* (2019).
- (14) (*) F. Iannelli, M. S. Mariani, I. Sokolov, *Influencers identification in complex networks through reaction-diffusion dynamics*, *Physical Review E* 98, 062302 (2018).
- (13) M. Medo, M. S. Mariani, L. L. , *Link Prediction in Bipartite Nested Networks*, *Entropy* 20 (10), 777 (2018).
- (12) (*) J.-H. Lin, C. J. Tessone, M. S. Mariani, *Nestedness maximization in complex networks through the fitness-complexity algorithm*, *Entropy* 20 (10), 768 (2018).
- (11) (*) M. S. Mariani, M. Medo, F. Lafond, *Early identification of important patents: Design and validation of citation network metrics*, To appear in *Technological Forecasting and Social Change* (2018), pre-print: <https://arxiv.org/abs/1710.09182>.
- (10) A. Sol -Ribalta, C. J. Tessone, M. S. Mariani, J. Borge-Holthoefer, *Revealing In-Block Nestedness: Detection and benchmarking*, *Physical Review E* 97, 062302 (2018).
- (9) (*) Z.-M. Ren, M. S. Mariani, M. Medo, Y.-C. Zhang, *Randomizing growing networks with a time-respecting null model*, *Physical Review E* 97, 052311 (2018).
- (8) (*) G. Vaccario, M. Medo, N. Wider, M. S. Mariani, *Quantifying and suppressing ranking bias in a large citation network*, *Journal of Informetrics*, 11: 766-782 (2017).
- (7) (*) H. Liao, M. S. Mariani, M. Medo, Y.-C. Zhang, M.-Y. Zhou, *Ranking in evolving complex networks*, *Physics Reports* 689: 1-54 (2017).
- (6) (*) M. S. Mariani, M. Medo, Y.-C. Zhang, *Identification of milestone papers through time-balanced network centrality*, *Journal of Informetrics* 10: 1207-1223 (2016).
- (5) (*) R.-J. Wu, G.-Y. Shi, Y.-C. Zhang, M. S. Mariani, *The mathematics of non-linear metrics for nested networks*, *Physica A* 460: 254-269 (2016).
- (4) M. Medo, M. S. Mariani, A. Zeng, Y.-C. Zhang, *Identification and impact of discoverers in online social systems*, *Scientific Reports* 6: 34218 (2016).
- (3) (*) M. S. Mariani, M. Medo, and Y.-C. Zhang, *Ranking nodes in growing networks: When PageRank fails*, *Scientific Reports* 5:16181 (2015).
- (2) (*) M. S. Mariani, A. Vidmer, M. Medo, Y.-C. Zhang, *Measuring economic complexity of countries and products: which metric to use?*, *European Physical Journal B* 88.11: 1-9 (2015).
- (1) M. S. Mariani, G. Parisi, and C. Rainone. *Calorimetric glass transition in a mean-field theory approach*, *Proceedings of the National Academy of Sciences* 112.8: 2361-2366 (2015).

Submitted articles (3)

- (3) M. Medo, A. Zeng, Y.-C. Zhang, M. S. Mariani, *Optimal timescale of community detection in growing networks*, submitted, pre-print: <https://arxiv.org/pdf/1809.04943.pdf>.
- (2) S. Xu, Q. Zhang, L. L , M. S. Mariani, *Recommending investors for new startups through diffusion on tripartite networks*, under review for Information Sciences, second round.
- (1) (*) S. Zhang, M. Medo, L. L , M. S. Mariani, *The long-term impact of ranking algorithms in growing networks*, under review for Information Sciences, third round. Pre-print: <https://arxiv.org/abs/1805.12505>.

Talks and presentations

Presentations at international conferences (11)

- (11) May 2019: **Contributed talk** at the conference NetSci 2019, Burlington, Vermont, USA. Title of the talk: *Innovative individuals in temporal networks: identification, socio-economic characterization, and predictive applications.*
- (10) June 2018: **Poster** at the conference NetSci 2018, Paris, France. Title of the poster: *Ranking bias in networks: detection and suppression.*
- (9) June 2018: **Poster** at the conference NetSci 2018, Paris, France. Title of the poster: *Influencers identification in complex networks through reaction-diffusion dynamics.*
- (8) May 2018: **Invited talk** at the International Conference on Frontiers of Electronic Science and Technology, Chengdu, China. Title of the talk: *Influencers identification in complex networks through reaction-diffusion dynamics.*
- (7) Jan 2018: **Contributed talk** at NetSciX 2018, Hangzhou, China. Title of the talk: *Early identification of significant papers and patents in citation networks.*
- (6) July 2017: **Contributed talk** at the SigmaPhi 2017 conference, Corfu, Greece. Title of the talk: *A time-respecting null model to explore the structure of growing networks.*
- (5) July 2017: **Contributed talk** at the SigmaPhi 2017 conference, Corfu, Greece. Title of the talk: *Early-identification of significant nodes in growing networks.*
- (4) September 2016: **Contributed talk** at the 2016 Conference on Complex Systems, Amsterdam, Netherlands. Title of the talk: *Early identification of milestone papers.*
- (3) September 2016: **Invited talk** at the conference “Social and Economic Change as a Complex Dynamical System 2016”, satellite of the 2016 Conference on Complex Systems, Amsterdam, Netherlands. Title of the talk: *The essential role of time in information filtering.*
- (2) July 2016: **Contributed talk** at the conference “Complex Networks”, satellite of the StatPys conference, Marseille, France. Title of the talk: *Early identification of milestone papers.*
- (1) October 2015: **Poster** at the conference “Challenges in Data Science: a complex systems perspective”, Turin, Italy. Title of the poster: *Quantifying scientific impact: how (not) to use Google’s PageRank.*

Presentations at international workshops (3)

- (3) October 2018: **Invited talk** at the “Swiss Symposium on Network Science”, Zurich, Switzerland. Title of the talk: *Influence maximization based on network effective distance.*
- (2) September 2017: **Invited talk** at the workshop “Complex networks: from socio-economic systems to biology and brain”, Lipari, Italy. Title of the talk: *Identification of significant papers and patents in citation networks: citation count or PageRank?.*
- (1) September 2015: **Invited lecture** at the Growthcom Summer School on Socio-Economic Complex Systems, Lipari, Italy. Title of the lecture: *An analytic computation of country fitness.*

Invited talks and seminars at universities (6)

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| 2019 | Arison School of Business, Herzliya, Israel. |
| 2018 | Zhejiang University of Technology, Hangzhou, China. |
| 2017 | (3 seminars). Alibaba Business College, Hangzhou, China; Shanghai University of Economics and Finance, Shanghai, China; College of Computer Science and Software Engineering, Shenzhen University, Shenzhen, China. |
| 2016 | URPP Social Networks, University of Zurich, Zurich, Switzerland. |

Academic services

I. Reviewer for:

- *Research Policy*
- *Journal of Informetrics*
- *Scientometrics*
- *Scientific Reports*
- *PLOS ONE*
- *EPJ Data Science*
- *Entropy*
- *Journal of Physics Communications*
- *Journal of Computational and Applied Mathematics*

II. I served as session chair at:

- *NetSci X* conference.
- *Swiss Symposium on Network Science* (Swiss Chapter of the Network Science Society).

Outreach activity

I co-organized the following events:

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| October 2018 | 3rd <i>Swiss Symposium on Network Science</i> (Swiss Chapter of the Network Science Society). One-day workshop on Network Science with an interdisciplinary audience (ecology, economics, social science, physics). 40-50 participants; 9 invited speakers; keynote Prof. Dr. Santo Fortunato. |
| March 2018 | 2nd <i>Swiss Symposium on Network Science</i> (Swiss Chapter of the Network Science Society). 40-50 participants; 8 invited speakers; keynotes Prof. Dr. Ulrik Brandes and Prof. Dr. Paolo De Los Rios. |

Teaching

[S = Spring semester; F = Fall semester, SF= both Spring and Fall semester].

As a co-lecturer at the Department of Business Administration of the University of Zurich

- S18-19 Agent-based modelling for business, economics and social science (MA course).
- F18 Network Analytics for Marketing and Business (MA course).

As a teaching assistant at the Physics Department of the University of Fribourg

- S17 Thermodynamics (BA course, exercises and 1 lecture).
- S17 Computational Physics Atelier (MA course, project supervision).
- F16 Quantum Statistical Mechanics (MA course, exercises and 1 lecture).
- F15 Theoretical Physics Atelier (MA seminar on economic complexity).
- SF15-SF16 Advanced Physics Labs (BA physics experiments, supervision).
- F14 Physics Labs (BA physics experiments for medicine students, supervision).

Supervision of students

[in parentheses, the number of submitted/published papers together]

PhD students at the UESTC in China (co-supervision)

2018-present Shuqi Xu. Topic: *Quantifying success in science and technology.*

Master students at the UESTC in China (co-supervision)

2017-present Shilun Zhang (1). Topic: *Empirical models of information network growth.*

2017-present Fang Zhou (1). Topic: *Identification of influential nodes in social networks.*

2017-2018 Shuqi Xu (1). Topic: *Recommending investors to new start-ups.*

PhD students at the University of Zurich (collaborations as post-doc)

2017-present Jian-Hong Lin (1). Topic: *Nestedness in complex networks.*

2017-present Francesco De Collibus. Topic: *Discoverers of success in social systems.*