

# Roberta Sinatra

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Department of Computer Science  
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## Current and previous positions

**Feb 2019 - present:** Assistant Professor at the Department of Computer Science, IT University of Copenhagen, Copenhagen (Denmark)

**April 2017 - present:** External Faculty at the Complexity Science Hub, Vienna (Austria)

**October 2017 - present:** ISI Fellow, ISI Foundation, Turin (Italy)

**Jan 2016 - Jan 2019:** Assistant Professor at the Department of Network and Data Science, and at the Department of Mathematics and its Applications, Central European University, Budapest (Hungary)

**March 2016 - Jan 2019:** Visiting Research Assistant Professor at the Center for Complex Network Research, Northeastern University, Boston (MA, USA)

**Feb 2015 - Jan 2016:** Associate Research Scientist at the Center for Complex Network Research and Physics Department, Northeastern University, Boston (MA, USA)

**Apr 2014 - April 2015:** Visiting Research Scholar, Dana Farber Cancer Institute, Harvard Medical School, Boston (MA, USA)

**Apr 2012 - Jan 2015:** JSMF Postdoctoral Research Fellow at the Center for Complex Network Research and Physics Department, Northeastern University, Boston (MA, USA)

## Education

**Nov 2008 - Feb 2012:** Ph.D. in Physics, specialization in Network Science and Complex Systems (summa cum laude), University of Catania.

**Oct 2005 - Dec 2008:** MSc di Eccellenza - Specialistica (summa cum laude), Scuola Superiore di Catania<sup>1</sup>.

**Oct 2005 - Dec 2007:** MSc in Theoretical Physics (summa cum laude), University of Catania.

**Sep 2002 - Oct 2005:** Diploma di Eccellenza Triennale (summa cum laude), Scuola Superiore di Catania.

**Sep 2002 - Oct 2005:** BSc in Physics and Mathematics (summa cum laude), University of Catania.

## Grants, Fellowships, Awards

Co-PI of Templeton Foundation grant “Using Big Data to Quantify and Cultivate Genius”, Sep 2018 - Aug 2021 (\$360,000) - declined

PI in the ITI grant “Just Data” by CEU, Mar 2017 - Dec 2018 (€90,000).

Co-PI in the ITI grant “Gendered Creativity” by CEU, Sep 2016 - Dec 2017 (€100,000).

PI of a teaching development grant by CEU, September 2016 - Dec 2016 (€2,000).

Co-PI in the grant “Quantifying Scientific Success” by AFOSR-Europe, Apr 2016 - Dec 2017 (\$200,000).

Key research personnel in the grant “The Fundamentals of Predictability of Scientific Success” by the AFOSR, Feb 2015 - Jan 2018 (\$900,000 for two partners, I led the proposal writing).

Fellowship by the James S. McDonnell Foundation (\$200,000), Apr 2012 - Jan 2015.

Many national awards and fellowships during the grad and undergrad studies, amounting to ~€250,000.

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<sup>1</sup>The Scuola Superiore di Catania (SSC) is a special structure for higher education of the University of Catania, characterized by selective admission tests and strict performance requirements. It was instituted to develop the skills of young students, through additional classes and beforehand research initiation. Every student at SSC is a student at the University of Catania at the same time. Among other requirements, a SSC student has to have the highest marks in all disciplines and has to defend an additional final project thesis. See also <http://www.scuolasuperiorecatania.it>

## Publications

### *Preprints and working papers*

Preprints are available upon request:

M. Ma, M. Szell, A.-L. Barabási and R. Sinatra, **Science without borders**, in preparation.

M. Fontana, M. Iori, F. Montobbio, and R. Sinatra, **A bridge over troubled water: Interdisciplinarity, Novelty, and Impact**, submitted.

J. Huang, A. Gates, R. Sinatra and A.-L. Barabási, **Quantifying gender inequality in scientific careers across countries and disciplines**, submitted.

### *Peer-reviewed publications*

F. Battiston, F. Musciotto, D. Wang, A.-L. Barabási, M. Szell, R. Sinatra\*, **Taking Census of Physics**, *Nature Reviews Physics* **1**, 89-97 (2019).

(\*Corresponding author and research leader)

V. Sekara, P. Deville, S. Ahnert, A.-L. Barabási, R. Sinatra\*, and S. Lehman\*, **The Chaperone phenomenon in science**, *Proceedings of the National Academy of Sciences* **115(50)** 12603-12607 (2018).

(\*These authors led the research and contributed equally to the work)

S. P. Fraiberger, R. Sinatra, M. Resch, C. Riedl and A.-L. Barabási, **Quantifying Reputation and Success in Art**, *Science* **362** 825-829 (2018).

M. Szell, Y. Ma and R. Sinatra, **Interdisciplinarity: A Nobel Opportunity**, *Nature Physics*, **14(11)**(2018).

(\*Corresponding author and research leader)

L. Liu, Y. Wang, R. Sinatra, C. Lee Giles, C. Song, D. Wang, **Hot Hand Phenomena in Artistic, Cultural, and Scientific Careers**, *Nature* **559**, 396-399 (2018), arXiv:1712.01804.

**Data, media and code:** <https://lu-liu.github.io/hotstreaks/>.

**Featured in:** the Wall Street Journal, Bloomberg, Business Insider Australia, Wired, Daily Mail, The Times, Nature Editorial, El Pais, Phys.org, Herald Sun, Spiegel online, Studium.at, My San Antonio, The Japanese Times, Discover, Ars Technica.

Santo Fortunato, Carl T. Bergstrom, Katy Boerner, James A. Evans, Dirk Helbing, Stasa Milojevic, Alexander M. Petersen, Filippo Radicchi, Roberta Sinatra, Brian Uzzi, Alessandro Vespignani, Ludo Waltman, Dashun Wang, Albert-László Barabási, **Science of Science**, *Science* **359**, eaao0185 (2018).

A. Clauset\*, D. Larremore\* and R. Sinatra\*, **Data-driven predictions in the science of science**, *Science*, **355**, 477-480 (2017).

(\*These authors contributed equally to the work)

R. Sinatra, D. Wang, P. Deville, C. Song, and A.-L. Barabási, **Quantifying the evolution of individual scientific impact**, *Science*, **354** 6312 (2016).

**Interactive data visualization:** <http://scienceofsuccess.barabasilab.com>.

**Nature video:** <https://youtu.be/qlnxM-1d4BU>. **Featured in:** Science News, Nature News, New York Times, Wired, Scientific American, The Scientist, The Chronicle of Higher Education, Forbes, Huffington Post, Big Think, Inside High Red, Flowing Data, The Australian, NY magazine, PhysOrg, ACS, Chemistry World, Northeastern News, CEU News, Kellogg Insight, Science Alert, Science Top Stories, FastCoDesign, Scholarly Kitchen, University World News, Yahoo News, Herald Tribune, University Herald, ORF Science, Spiegel Online, Il Corriere della Sera, Il Fatto Quotidiano, Internazionale, Panorama, Adnkronos, Padova News, Science Blog, Interesting Engineering, La Vanguardia, ABC.es, Semana, Scienza.nl, El Digital de Asturias, AgenciaSinc, Improbable, 3 Quarks Daily, Librarius, Museum.

- R. Sinatra, P. Deville, M. Szell, D. Wang, A.-L. Barabási, **A century of physics**, *Nature Physics*, **11**(10), 791-796 (2015).
- H. Sayama and R. Sinatra, **Social Diffusion and Global Drift on Networks**, *Physical Review E*, **91**, 032809 (2015), arXiv:1410.3506.
- A. Cardillo, G. Petri, V. Nicosia, R. Sinatra, J. Gomez-Gardenes, and V. Latora, **Evolutionary dynamics of time-resolved social interactions**, *Physical Review E*, **90**, 052825 (2014).
- Y. Yoshimura, S. Sobolevsky, R. Sinatra, F. Girardin, J. P. Carrascal, J. Blat, and C. Ratti, **An analysis of visitors' sequential movement in the Louvre Museum: A study using Bluetooth data**, *Environment and Planning B: Planning and Design* **41**, 1113-1131 (2014). **Dynamic visualization and infographics: Art Traffic at Louvre**, <http://senseable.mit.edu/louvre>
- P. Deville, D. Wang, R. Sinatra, C. Song, V. Blondel, and A.-L. Barabási, **Career on the Move: Geography, Stratification, and Scientific Impact**, *Scientific Reports*, **4**, 4770 (2014). **Featured in:** The Economist, Physics Today, Research Fortnight.
- R. Sinatra and M. Szell, **Entropy and the Predictability of Online Life**, *Entropy* **16**(1), 543 (2014).
- J. Gómez-Gardeñes, V. Nicosia, R. Sinatra, and V. Latora, **Motion-induced synchronization in metapopulations of mobile agents**, *Physical Review E* **87**, 032814 (2013), arXiv:1211.4616.
- M. Szell, R. Sinatra, G. Petri, S. Thurner, and V. Latora **Understanding mobility in a social petri dish**, *Scientific Reports* **2**, 457 (2012), arXiv:1112.1220.
- S. Thurner, M. Szell, and R. Sinatra **Emergence of good conduct, scaling and Zipf laws in human behavioral sequences in an online world**, *PLoS one* **7**(1), e29796 (2012), arXiv:1107.0392.
- R. Lambiotte, R. Sinatra, M. Barahona, J.-C. Delvenne, T.S. Evans, and V. Latora, **Flow graphs: interweaving dynamics on structure**, *Physical Review E* **84**, 017102 (2011), arXiv:1012.1211.
- R. Sinatra, J. Gómez-Gardeñes, R. Lambiotte, V. Nicosia, and V. Latora, **Maximal-entropy random walks in complex networks with limited information**, *Physical Review E* **83**, 030103(R) (2011).
- F. De Vico Fallani\*, V. Nicosia\*, R. Sinatra\*, L. Astolfi, F. Cincotti, D. Mattia, C. Wilke, A. Doud, V. Latora, B. He and F. Babiloni, (*\*These authors contributed equally to the work*) **Defecting or Not Defecting: How to "Read" Human Behavior during Cooperative Games by EEG Measurements**, *PloS One* **5**, 12:e14187 (2010), arXiv:1101.5322.
- R. Sinatra, D. Condorelli, and V. Latora, **Networks of motifs from sequences of symbols**, *Physical Review Letters* **105**, 178702 (2010), arXiv:1002.0668. **Featured in:** Physorg.com, Physicscentral.com.
- R. Sinatra, J. Iranzo, J. Gómez-Gardeñes, M. Floría, V. Latora, and Y. Moreno, **The Ultimatum Game in Complex Networks**, *J. Stat. Mech.* P09012 (2009), arXiv:0807.0750v3.
- R. Sinatra, F. De Vico Fallani, V. Latora, L. Astolfi, D. Mattia, F. Cincotti, and F. Babiloni **Cluster structure of functional networks estimated from high-resolution EEG data**, *International Journal of Bifurcation and Chaos (IJBC)*, Vol. 19, No. 2 (2009) 665676, arXiv:0806.2840v1.
- F. De Vico Fallani\*, R. Sinatra\*, L. Astolfi, D. Mattia, F. Cincotti, V. Latora, S. Salinari, M.G. Marciani, A. Colosimo, and F. Babiloni, (*\*These authors contributed equally to the work*) **Community structure of cortical networks in spinal cord injured patients**, *Conf. Proc. IEEE Eng. Med. Biol. Soc. 2008*, 3995-8 (2008).

*Other publications*

M. Szell and R. Sinatra, **Research funding goes to rich clubs**, *Proceedings of the National Academy of Sciences*, **112** (48), 14749-14750 (2015).

R.Sinatra, Homeworks in the textbook **Network Science**, by A.-L. Barabási, (2016).

R. Sinatra, J. Gómez-Gardeñes, Y. Moreno, D. Condorelli, L. M. Florìa, V. Latora **Structural and dynamical properties of cellular and regulatory networks**, in *Statistical Mechanics of Cellular Systems and Processes*, edited by M. H. Zaman, Cambridge University Press (2009).

## Selected invited talks

Gave more than 30 keynote and invited talks, and 50 contributed talks at conferences, workshops and schools. Including the following selection:

(forthcoming) Invited talk at *Metascience Symposium*, September 5-8, 2019, Stanford University, Palo Alto (CA, USA).

(forthcoming) Invited talk at *Femme de l'Annee*, May 4, 2019, Monte Carlo (Monaco).

Keynote talk at the 5th Workshop on Big Scholarly Data, in conjunction with the ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2018), 20 August 2018, London (UK).

Invited talk at Big Dive, Turin

Keynote talk at CSH highlight event *Social Informatics: en route towards Asimov's Psychohistory?*, 31 January 2018, Vienna (Austria).

Plenary talk at *Science Crossroads*, 25 October 2017, Turin (Italy). ISI fellow award ceremony.

Invited talk at the *IBSEN European project workshop*, 4-6 September 2017, Helsinki (Finland).

Plenary invited talk at *Netsci 2017*, June 2017, Indianapolis (IN, USA) - 700 participants.

Plenary invited talk at *DPG Spring meeting, Socio-economical system division*, March 2017, Dresden (Germany) - 300 participants.

Invited talk at the *Italian Zentrum* - University of Innsbruck  
23 January 2017, Innsbruck (Austria).

Invited talk at the *the Italian-Israeli satellite, at NetsciX*, 16 January 2017, Tel Aviv (Israel).

Plenary talk at the *Technology Symposium, European Forum Alpbach*, 25 August 2016, Alpbach (Austria) - 3,000 participants.

Invited talk at the *Competition Networks and Centrality*, Satellite of Netsci 2016  
30 May 2016, Seoul (South Korea).

Plenary talk at the *Modeling Science, Technology & Innovation Conference*, National Academy of Sciences,  
17-18 May 2016, Washington DC (USA),

Invited talk at *RECENS*, National Academy of Science Budapest  
6 April 2016, Budapest (Hungary).

Invited talk at the *Computational Social Science workshop*, University of Chicago  
10 March 2016, Chicago (Illinois, USA).

Invited lecture at the *Strategic Studies Group (SSG)*, Office of Naval Research, 30 October 2015, Newport (Rhode Island, USA).

Invited talk at the *Quantifying Science* (satellite meeting of CCS'15)  
1 October 2015, Tempe (Arizona, USA).

Invited Lecturer at the *Computational Physics of Complex and Disordered Systems school*, DPG, German Physical Society), 20-25 September 2015, Bad Honnef (Germany).

Plenary talk at the *International Symposium: Academic Excellence: Between Holy Grail and Measurable Objectives*, University of Maribor, 19-20 January 2015, Maribor (Slovenia).

Colloquium at the *Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas (IIMAS)*  
Universidad Nacional Autónoma de México (UNAM)  
3 October 2014, Mexico City (Mexico).

Invited lecture at the *ECCS warm-up complex networks school* (co-located with ECCS'14), 20 Sep. 2014, Lucca (Italy).

Invited talk for *Network seminars*, University of Oxford, 19 March 2013, Oxford (UK).

Invited at the Dagstuhl Seminar 11452 *Analysis of Dynamic Social and Technological Networks*, November 2011, Dagstuhl (Germany).

## Scientific Activity

### *Editorial Activity*

**March 2018 - present** Academic Editor for *EPJ Data Science*

**October 2017 - present** Academic Editor for *PLoS one*

**2017-2018** Guest Editor for a volume about “Success” on *Advances in Complex Systems*

**2017** Guest Editor for a volume on *Applied Network Science*

### **Editor of the following volumes:**

Complex Networks IX - Proceedings of the 9th Conference on Complex Networks CompleNet 2018  
S. Cornelius, K. Coronges, B. Goncalves, R. Sinatra, A. Vespignani (Editors)

Complex Networks VIII - Proceedings of the 8th Conference on Complex Networks CompleNet 2017  
B. Goncalves, R. Menezes, R. Sinatra, V. Zlatik (Editors)

Complex Networks VII - Proceedings of the 7th Workshop on Complex Networks CompleNet 2016,  
H. Cherifi, B. Goncalves, R. Menezes, R. Sinatra (Editors)

### *Organizer*

Organizer for *DataBeers Copenhagen*  
<https://databeerscph.tumblr.com/>

Poster chair for *Netsci 2018*  
11-15 June 2018, Paris (France).  
<https://www.netsci2018.com/>

Program chair for *Complenet 2018*  
5-8 March 2018, Boston (MA, USA).  
<http://2018.complenet.org/>

Organizer of *Gendered creativity workshop*  
25-26 May 2017, Central European University, Budapest (Hungary).  
<http://gcw-ceu.com/>

Program chair for *Complenet 2017*  
21-24 March 2017, Dubrovnik (Croatia).  
<http://2017.complenet.org/>

Organizer of *DAPS 2016*  
Workshop on Data Mining for the Analysis of Performance and Success  
co-located with IEEE International Conference on Data Mining series (ICDM)  
12 December 2016, Barcelona (Spain).  
<http://kdd.isti.cnr.it/daps2016/>

*Quantifying Success (Netsci'16 satellite meeting)*,  
Organizer with J. Huang and T. Jia  
31 May 2016, Seould (South Korea)  
<http://www.quantifysuccess.org/netsci2016/>

Program chair for *Complenet 2016*  
23-25 March 2016, Dijon (France).  
<http://2016.complenet.org/>

Chief Organizer  
*TEDxSSC*  
19 December 2015, Catania (Italy).  
<http://www.tedxssc.it>

*Netsci Backstage*  
(with P. Expert, G. Miritello, G. Petri and M. Szell)  
2 June 2015, Zaragoza (Spain).

*TEDxSSClive*  
18 March 2015, Catania (Italy).  
<http://www.tedxssc.it>

Co-chair and sponsorship manager  
*TEDxSSC*  
18 October 2014, Catania (Italy).  
<http://www.tedxssc.it>

*Quantifying Success (ECCS'13 satellite meeting)*,  
(with D. Wang and C. Song)  
18 September 2013, Barcelona (Spain)  
[http://barabasilab.neu.edu/success\\_eccs2013](http://barabasilab.neu.edu/success_eccs2013)

Local Organizer  
*European Conference on Complex Systems 2011 (ECCS'11)*,  
12-16 September 2011, Vienna (Austria)  
<http://www.eccs2011.eu>

*XNet: Complexity and Networks (ECCS'11 satellite meeting)*,  
 (with R. Lambiotte, J.P. Onnela, and M. Szell) 14-15 September 2011, Vienna (Austria)  
<http://www.eccs2011.eu/satellites/xnet/>

### *Reviewer for:*

#### *Journals:*

Nature, Science, Nature Physics, Nature Communications, Nature Human Behavior, Proceedings of the National Academy of Sciences, EPJ Data Science, ScientificData, Scientific Reports, Social Networks, Research Policy, Network Science, Applied Network Science, Physical Review Letters, Physical Review E, Journal of Infometrics, RoyalSocietyOpenScience, New Journal of Physics, European Physics Letters, Journal of Statistical Mechanics: theory and experiments (JStat), PeerJ, Environmental&Planning B, PLoS One, Physica A, Physics Letters A, Journal of Physics A, Advances in Complex Systems, Complexity, Chaos, IEEE.

#### *Books:*

Cambridge University Press

#### *Conferences:*

Program committee member for Netsci 2017, Netsci 2018, Netsci-x 2015, ICWSM-15, ICWSM-16, ICWSM-17 (Senior PC member), Dyno 2015 (co-located with ASONAM 2015), Complenet 2013, Complenet 2014, Complenet 2015, SEDPAM and CSS (co-located with ECCS'14), WWW'14.

#### *Grants:*

2015 Review panel member, CIS division, National Science Foundation, USA  
 2016 National Science Foundation (NSF)  
 2016 Netherlands Organization for Scientific Research (NWO)  
 2017 MOVE-IN Louvain incoming post-doc Fellowships  
 2018 Deutsche Physikalische Gesellschaft (DPG)  
 2019 FET OPEN H2020 (European Commission)

## Teaching and Supervision

### *Courses*

#### **Academic year 2017-2018**

“Scientific Python”, Central European University (3 credits)  
 “Data and network visualization”, Central European University (2 credits)  
 “Just Data”, University wide course, Central European University (2 credits), Co-Instructor.

#### **Academic year 2016-2017**

“Scientific Python”, Central European University (3 credits)  
 “Data and network visualization”, Central European University (2 credits)  
 “Data mining and big data analytics”, Central European University (2 credits)  
 “Networks and Computers”, Central European University (3 credits)

#### **Academic year 2015-2016**

“Scientific Python”, Central European University (3 credits)  
 “Networks and Computers”, Central European University (3 credits)  
 “Complex Networks”, Northeastern University. Co-instructed with Prof. A.-L. Barabási and Dr. Sean Cornelius

#### **Academic year 2014-2015**

“Complex Networks”, Northeastern University. Co-instructed with Prof. A.-L. Barabási

**Academic year 2010-2011**

Recitations for the course "Complex networks: Structure and Dynamics", Scuola Superiore di Catania. Course presented by Prof. Vito Latora

**Other teaching**

Gave lectures on Network Science at the "ECCS warmup summer school" (Lucca, 2014), Computational Physics of Complex and Disordered Systems school of DPG (2015).

*Supervision*

**Federico Battiston**, Post-doc working on "Modelling the evolution of Interdisciplinarity in Scientific Careers", PhD in Mathematics from Queen Mary University of London, September 2017 - present.

**Federico Musciotto**, Post-doc working on "Quantifying biases in success", PhD in Physics from University of Palermo, January 2018 - present.

**Milan Janosov**, PhD Candidate in Network Science at the Central European University, Hungary 2015-present

**Kinga Andras**, PhD Candidate in Network Science at the Central European University, Hungary, currently on sick leave.

**Zsombor Koman**, Master Student in Mathematics at the Central European University, Hungary, 2017-2018.

**Martina Iori**, visiting PhD Student in Economics at the University of Turin, Italy, 2017-2018.

*Co-supervision*

**Emma Barme**, PhD student at the Frontières du Vivant (FdV) Doctoral School, France (co-advised with Dr. Marc Santolini), starting October 2018.

**Yifang Ma**, visiting student for two years at Northeastern University, PhD Candidate in Mathematics at the University of Peking, China, 2014-2016. Currently PostDoc at Kellogg Business School at Northwestern University

**Qing Jin**, PhD Candidate in Physics at Northeastern University, USA (advisor: Prof. A.-L. Barabási), 2013-2014.

**Pierre Deville**, visiting student for two years at Northeastern University, PhD Candidate in Applied Mathematics at the University of Louvain Belgium (advisor in Belgium: Prof. V. Blondel), 2013-2015. Currently: Chief Data Scientist at Swan Insights and Instructor at University of Brussels.

**Languages**

**Italian** (native), **English** (fluent), **German** (fluent), **Spanish** (beginner), **Hungarian** (beginner), **Danish** (beginner).