

# Michael Szell

## Associate Professor

NEtworks, Data, and Society (NERDS)  
Computer Science Department  
IT University of Copenhagen  
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## Positions held

Associate professor, Computer Science Department, IT University of Copenhagen, since Oct 2020

External researcher, ISI Foundation, since Nov 2021

External faculty, Complexity Science Hub Vienna, since Apr 2017

Founder and manager of Bayer & Szell OG, since Sep 2006

Developer and administrator of the Massive Multiplayer Online Game *Pardus*, since Jul 2004

## *Past positions*

Assistant professor, Computer Science Department, IT University of Copenhagen  
Feb 2019 – Sep 2020

External researcher, ISI Foundation  
Aug 2019 – Jul 2020

Assistant professor, Department of Network and Data Science, Central European University  
Oct 2017 – Jan 2019

Researcher, Centre for Economic and Regional Studies, Hungarian Academy of Sciences  
Sep 2017 – Jan 2019

Adjunct visiting professor, Center for Complex Network Research, Northeastern University  
Sep 2016 – Jan 2019

Research fellow, Centre for Social Sciences, Hungarian Academy of Sciences  
Sep 2016 – Sep 2017

Researcher in residence, moovel lab, moovel Group GmbH  
Sep 2016 – Dec 2016

Postdoctoral research associate, Center for Complex Network Research, Northeastern University  
Jul 2014 – Sep 2016

Postdoctoral research fellow, Senseable City Laboratory, Massachusetts Institute of Technology  
Apr 2012 – Jul 2014

Research assistant, Section for Science of Complex Systems, Medical University of Vienna  
Jan 2009 – Dec 2011

## Research interests

Urban data science, Human mobility, Sustainable transport

Data visualization, Complex systems, Network science

Quantifying human behavior and social networks, in particular online and in cities

## Education

Ph.D. in Physics, summa cum laude, University of Vienna, Mar 2012

M.Sc. in Technical Mathematics, Vienna University of Technology, Oct 2007

## Skills

Programming: Python, MATLAB, PHP, SQL, HTML/CSS, MongoDB

Data mining, Databases, Web scraping, Online game development

Languages: German, Hungarian (native), English (proficient), Italian (conversational), Danish (basic)

## Publications

\* denotes corresponding authorship

### Preprints

P. Folco, L. Gauvin, M. Tizzoni, M. Szell\*

**Data-driven bicycle network planning for demand and safety**, *arXiv:2203.14619* (2022)

A. Battiston, L. Napoli, P. Bajardi, A. Panisson, A. Perotti, M. Szell, R. Schifanella

**Revealing the determinants of gender inequality in urban cycling with large-scale data**, *arXiv:2203.09378* (2022)

L.G. Natera Orozco, L. Alessandretti, M. Saberi, M. Szell, F. Battiston

**Multimodal urban mobility and multilayer transport networks**, *arXiv:2111.02152* (2021)

### Peer-reviewed publications

M. Klanjčić, L. Gauvin, M. Tizzoni, M. Szell\*

**Identifying urban features for vulnerable road user safety in Europe**, *EPJ Data Science* 11, 27 (2022)

M. Szell\*, S. Mimar, T. Perlman, G. Ghoshal, R. Sinatra

**Growing urban bicycle networks**, *Scientific Reports* 12, 6765 (2022)

A. Vybornova, T. Cunha, A. Gühnemann, M. Szell\*

**Automated Detection of Missing Links in Bicycle Networks**, *Geographical Analysis* 0, 1–29 (2022)

M. Coscia, M. Szell

**Multiplex Graph Association Rules for Link Prediction**, *Proceedings of the International Conference on Web and Social Media (ICWSM)* 15(1), 129–139 (2021)

M. Schläpfer, L. Dong, K. O’Keeffe, P. Santi, M. Szell, H. Salat, S. Anklesaria, M. Vazifteh, C. Ratti, G.B. West

**The universal visitation law of human mobility**, *Nature* 593(7860), 522–527 (2021)

L.G. Natera Orozco, F. Battiston, G. Iñiguez, M. Szell\*

**Data-driven strategies for optimal bicycle network growth**, *Royal Society Open Science* 7:201130 (2020)

L.G. Natera Orozco, F. Battiston, G. Iñiguez, M. Szell\*

**Extracting the multimodal fingerprint of urban transportation networks**, *Transport Findings* 13171 (2020)

F. Battiston, F. Musciotto, D. Wang, A.-L. Barabási, M. Szell, R. Sinatra

**Taking census of physics**, *Nature Reviews Physics* 1, 89–97 (2019)

M. Szell, Y. Ma, R. Sinatra

**A Nobel opportunity for interdisciplinarity**, *Nature Physics* 14, 1075–1078 (2018)

M. Szell\*

**Crowdsourced quantification and visualization of urban mobility space inequality**, *Urban Planning* 3, 1–20 (2018)

S. Grauwin, M. Szell, S. Sobolevsky, P. Hövel, F. Simini, M. Vanhoof, Z. Smoreda, A.-L. Barabási, C. Ratti  
**Identifying the structural discontinuities of human interactions**, *Scientific Reports* 7, 46677 (2017)

R. Tachet, O. Sagarra, P. Santi, G. Resta, M. Szell, S. Strogatz, C. Ratti  
**Scaling law of urban ride sharing**, *Scientific Reports* 7, 42868 (2017)

M. Nyhan, S. Sobolevsky, C. Kang, P. Robinson, A. Corti, M. Szell, D. Streets, Z. Lu, R. Britter, S.R.H. Barrett, C. Ratti  
**Predicting vehicular emissions in high spatial resolution using pervasively measured transportation data and microscopic emissions model**, *Atmospheric Environment* 140, 352–363 (2016)

R. Sinatra, P. Deville, M. Szell, D. Wang, A.-L. Barabási  
**A century of physics**, *Nature Physics* 11, 791–796 (2015)

O. Sagarra, M. Szell, P. Santi, A. Diaz-Guilera, C. Ratti  
**Supersampling and network reconstruction of urban mobility**, *PLOS ONE* 10(8), e0134508 (2015)

O. Mryglod, B. Fuchs, M. Szell, Y. Holovatch, S. Thurner  
**Interevent time distributions of human multi-level activity in a virtual world**, *Physica A* 419, 681–690 (2014)

P. Santi, G. Resta, M. Szell\*, S. Sobolevsky, S. Strogatz, C. Ratti  
**Quantifying the benefits of vehicle pooling with shareability networks**, *Proceedings of the National Academy of Sciences* 110(37), 13290–13294 (2014)

M. Szell\*, S. Grauwin, C. Ratti  
**Contraction of online response to major events**, *PLOS ONE* 9(2), e89052, (2014)

R. Sinatra, M. Szell\*  
**Entropy and the predictability of online life**, *Entropy* 16(1), 543–556 (2014)

S. Sobolevsky, M. Szell, R. Campari, T. Couronné, Z. Smoreda, C. Ratti  
**Delineating geographical regions with networks of human interactions in an extensive set of countries**, *PLOS ONE* 8(12), e81707 (2013)

S. Thurner, P. Klimek, M. Szell, G. Duftschmid, G. Endel, A. Kautzky-Willer, D. Kasper  
**Quantification of excess-risk for diabetes when born in times of hunger, in an entire population of a nation, across a century**, *Proceedings of the National Academy of Sciences* 110, 4703–4707 (2013)

M. Szell, S. Thurner  
**How women organize social networks different than men**, *Scientific Reports* 3, 1214 (2013)

M. Szell, R. Sinatra, G. Petri, S. Thurner, V. Latora  
**Understanding mobility in a social petri dish**, *Scientific Reports* 2, 457 (2012)

M. Szell\*, S. Thurner\*  
**Social dynamics in a large-scale online game**, *Advances in Complex Systems* 15, 1250064 (2012)

S. Thurner, M. Szell, R. Sinatra

**Emergence of good conduct, scaling and Zipf laws in human behavioral sequences in an online world,** *PLOS ONE* 7, e29796 (2012)

M. Szell, S. Thurner

**Measuring social dynamics in a massive multiplayer online game,** *Social Networks* 32, 313–329 (2010)

M. Szell, R. Lambiotte, S. Thurner

**Multirelational organization of large-scale social networks in an online world,** *Proceedings of the National Academy of Sciences* 107, 13636–13641 (2010)

### *Other academic publications*

B. Resch\*, M. Szell\*

**Human-Centric Data Science for Urban Studies,** *ISPRS International Journal of Geo-Information* 8, 584 (2019)

Y. Holovatch, O. Mryglod, M. Szell, S. Thurner

**Analyses of a virtual world,** In: *Math Meets Myth: Complexity-science approaches to folktales, myths, sagas, and histories*, Springer, Eds.: R. Kenna, M. Maccarron, P. Maccarron (2017)

M. Szell\*, R. Sinatra

**Research funding goes to rich clubs,** *Proceedings of the National Academy of Sciences* 112(48), 14749–14750 (2015)

M. Szell\*, P. Santi, C. Ratti

**Trip sharing in the era of self-driving cars,** *Autonomous Vehicles Conference*, New York University (2015)

P. Santi, G. Resta, M. Szell\*, S. Sobolevsky, S. Strogatz, C. Ratti

**Reply to Lopez et al.: Sustainable implementation of taxi sharing requires understanding systemic effects,** *Proceedings of the National Academy of Sciences* 111(51), E5489 (2014)

M. Szell\*, B. Groß

**Hubcab – Exploring the Benefits of Shared Taxi Services,** *Decoding the City*, De Gruyter, Eds.: D. Offenhuber, C. Ratti (2014)

M. Szell

**Connecting Paradigms,** *Science* 343(6147), 970–971 (2014)

M. Szell\*, B. Groß

**Hubcab – Taxi-Fahrgemeinschaften, digital erkundet,** *Stadt entschlüsseln*, Bauwelt Fundamente 150, Birkhäuser, Eds.: D. Offenhuber, C. Ratti (2013)

S. Thurner, P. Klimek, M. Szell, G. Duftschmid, G. Endel, A. Kautzky-Willer, D. Kasper

**Reply to Klitz and Niklasson: Can viral infections explain the cross-sectional Austrian diabetes data?,** *Proceedings of the National Academy of Sciences* 110, E2751 (2013)

M. Szell

**Statistical physics approaches to large-scale socio-economic networks,** *Dissertation*, University of Vienna (2011)

S. Thurner, M. Szell (Eds.)

**Book of abstracts ECCS'11 Vienna,** *European Conference on Complex Systems 2011*, Löcker (2011)

M. Szell, G. Petri, K. Zhao, D. Levin

**Human mobility in an online world**, *Santa Fe Summer School 2010 Project Paper* (2010)

M. Szell

**Finite Differenzen Verfahren zur numerischen Lawinensimulation**, *Diploma thesis*, Vienna University of Technology (2007)

M. Szell, F. Judex

**Petri Net Modelling of Different Strategies in ARGESIM Comparison C4 “Dining Philosophers” with HPSim**, *Simulation News Europe* 17, 1 (2007)

### *Other non-academic publications*

M. Szell

**Identifying urban features for vulnerable road user safety in Europe**, *BMC Blog Network* (2022)

O. Anker, S. Haustein, K. Hyldekær Janstrup, A. Fjendbo Jensen, M. Møller, J. Rich, M. Freudendal-Pedersen, O.B. Jensen, H. Lahrmann, A. Valderrama, M. Szell, H. Skov-Petersen, J. Troelsen, J. Schipperijn  
**14 forskere: Videnscenter for cyklisme skal ikke høre under Vejdirektoratet**, *Altinget* (2021)

M. Szell

**Bæredygtige byer kræver målrettet investering i cykelinfrastruktur**, *Ingeniøren / Mobilitytech* (2021)

M. Szell, J. Kickbusch

**Brug ny mobilitetslov til at skabe et mere bæredygtigt byliv**, *FINANS* (2021)

P. Heigren, M. Winding, M. Szell

**Cykling i byen: Små investeringer i infrastruktur binder din by sammen**, *Ingeniøren / Mobilitytech* (2021)

### Data visualization projects

**GrowBike.Net**, Jul 2021, [growbike.net](https://growbike.net)

An interactive visualization platform growing cohesive urban bicycle networks - something that every modern city should have. Studying these synthetic networks informs us about the geometric limitations of urban bicycle network growth and can lead to better designed bicycle infrastructure in cities.

**Taxonomy of Urban Bicycle Network Approaches**, Jan 2021, [github.com/mszell/taxonomybikenw](https://github.com/mszell/taxonomybikenw)

The idea of this visualization is to identify the most distinct environments for cycling arriving from different approaches of urban planning.

**Stephen Hawking Career**, March 2018, [michael.szell.net/hawking](https://michael.szell.net/hawking)

A Science of Science tribute to Stephen Hawking. This interactive plot allows the exploration of the influential physicist's oeuvre – scientific papers and books – and its impact.

**What the Street!?**, June 2017, [whatthetstreet.com](https://whatthetstreet.com)

An online platform for intuitive and playful exploration of wasted mobility space in cities, of uneven distribution of space between different modes of transportation, and how massive areas of car parking could be regained for the public.

**HubCab**, Mar 2014, [www.hubcab.org](https://www.hubcab.org)

An interactive visualization that invites you to explore the ways in which over 170 million taxi trips connect the City of New York in a given year. This interface provides a unique insight into the inner workings of the city from the previously invisible perspective of the taxi system with a never before seen granularity.

**Tweet Bursts**, Feb 2014, [senseable.mit.edu/tweetbursts](http://senseable.mit.edu/tweetbursts)

Visual exploration of our collective excitement towards major events: The more excited we are, and the more intense the flurry of messages in the collective, the shorter our messages become.

## Talks

### *Keynotes and invited talks*

*Physics and Collective Dynamics of Future Mobility* workshop at Max Planck Institute, Dresden, Germany (remotely), Mar 2022

Towards a human-centric urban data science

*General Assembly* of the Cycling Embassy of Denmark, Copenhagen, Denmark, Mar 2022

Netværksanalyse af den danske cykelinfrastruktur

Copenhagen Municipality, Copenhagen, Denmark, Dec 2021

Finding the missing links in the Copenhagen bike network

*Supercykelstier* Frokostmøde, Copenhagen, Denmark, Dec 2021

Netværksanalyse af den danske cykelinfrastruktur

*Urban Complex Systems* satellite of CCS 2021 conference, Lyon, France (remotely), Oct 2021

Making cities better with human-centric urban data science

*City Interaction Lab*, Paris, France (remotely), May 2021

Vulnerable road user safety in Europe, and towards a science of bicycle network design

*Supercykelstier*, Copenhagen, Denmark (remotely), Mar 2021

Data-driven strategies for optimal bicycle network growth

*MIT Medial Lab*, Cambridge, USA (remotely), Sep 2020

Human-centric Urban Data Science with OpenStreetMap

EFC Funders Forum on Sustainable Cities, Turin, Italy, Oct 2019

Revealing wasted urban space with crowd-sourced data

*Complex networks* workshop, Lipari, Italy, Jul 2019

Taking census of Physics and of the Nobel Prize

*DataBeers Copenhagen*, Denmark, May 2019

Understanding wasted mobility space with crowdsourced urban data

Keynote talk at *Parallel Cities* Science Forum at BLOXHUB, Copenhagen, Denmark, Mar 2019

Measuring Mobility Space Inequality

*Mathematical modelling* seminar, Budapest, Hungary, Sep 2018

Mathematical modelling of human mobility

*Complex networks* workshop, Lipari, Italy, Jul 2018

Quantitative analysis of urban shareability networks and mobility spaces

*Big Dive* at ISI Foundation, Turin, Italy, Jul 2018

Urban data science towards sustainable cities: From taxi sharing to mobility space equality

External Faculty Meetup at *Complexity Science Hub*, Vienna, Austria, May 2018

Make cities great again: Understand urban complexity, but embrace simplicity

*Urban Mobility* OpenStreetMap Hungary Meetup, Budapest, Hungary, May 2018

Using OpenStreetMap for Quantification and Visualization of Urban Mobility Space Inequality

Keynote talk at *Innovation & Cooperation* event of Wiener Stadtwerke at TU Wien, Vienna, Austria, Apr 2018

Urban Data Culture – Notwendigkeit und Chancen datenbasierter, interdisziplinärer Stadtentwicklung

*AI and Urban Life* satellite at *NetSci-X 2018*, Hangzhou, China, Jan 2018  
 Exploring New York City Taxi Trails and Sharing Our Way to a More Sustainable Urban Future  
 Invited talk at *Hungarian Academy of Sciences*, Budapest, Hungary, Nov 2017  
 Exploring quantitatively sharing benefits and inequalities in urban transportation  
 Workshop on Complex Systems at *Complexity Science Hub Vienna*, Vienna, Austria, Oct 2017  
 Towards a quantitative understanding of cities using network science and large-scale data analysis  
 Keynote talk at *COSTNET2017 Conference*, Palma de Mallorca, Spain, Oct 2017  
 Unveiling untapped potential in cities: From taxi sharing to mobility space inequality  
*Harvard University*, Cambridge, USA, Jul 2017  
 Visual exploration of urban mobility space inequality with What the Street!?  
*Northwestern University*, Evanston, USA, Jul 2017  
 Quantifying sharing benefits and injustice in urban transportation  
*Senseable City Lab, MIT*, Cambridge, USA, Jun 2017  
 Exploring the arrogance of space with What the Street!?  
*Quantifying success* satellite at *NetSci 2017*, Indianapolis, USA, Jun 2017  
 The success of teams and interdisciplinary research  
 Talk at Center for Network Science, Central European University, Budapest, Hungary, May 2017  
 Understanding social networks and collective behavior in online and urban environments  
*Physics of Flexible Mobility* symposium at *DPG Spring Meeting*, Dresden, Germany, Mar 2017  
 Mobility in shareability networks  
*moovel meetup* at *moovel Group GmbH*, Stuttgart, Germany, Sep 2016  
 The science of trip-sharing  
 Seminar at “Lendület” Research Center for Educational and Network Studies (RECENS), Budapest, Hungary, Jan 2016  
 Conflict and cooperation in large social networks  
*Autonomous Vehicles* Conference at New York University, New York, USA, May 2015  
 Trip-sharing in the age of self-driving cars  
*Understanding Complexity* Conference, Vienna, Austria, Feb 2015  
 Understanding Human Society with a Social Petri Dish  
*Zurich meets New York* Festival at New York Academy of Science, New York, USA, May 2014  
 Using virtual worlds to explore behavior of people  
*Social Network Analysis* Colloquium at ETH Zürich, Switzerland, Feb 2014  
 The Social Petri Dish and New Perspectives in Social Network Analysis  
*Urban Beers* Meetup, Barcelona, Spain, Sep 2013  
 Taxi pooling in New York City: a network-based approach to optimize shared mobility  
*FuturICT Workshop* at MIT Medial Lab, Cambridge, Feb 2013  
 Online games as platforms for measuring socio-economic behavior  
*Macro Connections* Seminar at Harvard University, Cambridge, USA, Oct 2011  
 Understanding collective socio-economic behavior in an online world  
 Talk at Barabasilab, Northeastern University, Boston, USA, Oct 2011  
 Structure and dynamics of multi-relational, socio-economic networks in an online world  
*Games Technology Workshop* at ETH Zürich, Switzerland, Mar 2011  
 Browser-based MMOGs: Technology and use as research tools  
 Interdisciplinary Seminar *Modeling Complex Socio-Economic Systems and Crises* at ETH Zürich, Switzerland, Feb 2011  
 Social Networks in Multiplayer Online Games

Invited talk at ETH Zürich, Switzerland, Feb 2011  
Massive Multiplayer Online Games as Socio-economic Labs

*IIASA Xevents Workshop*, Laxenburg, Austria, Mar 2010  
Extreme events in a large-scale, virtual human society

Invited talk at University of Catania, Italy, Oct 2009  
Measuring the evolution of socio-economical structure in an online game

Invited lecture at the Department of Education and Human Development, University of Vienna, Austria, Jun 2008  
Pardus – Funktion und Aufbau eines Browser-Spiels

*ARGESIM Simulation Workshop*, Siena, Italy, Sep 2007  
Finite Differenzen Verfahren zur numerischen Lawinensimulation  
Pardus – Funktion und Aufbau eines Browser-Spiels

*Workshop for avalanche dynamics* at the Austrian service for Torrent and Avalanche Control, Schwaz, Austria, Oct 2007  
Finite Differenzen Verfahren zur numerischen Lawinensimulation

### *Contributed talks*

*UrbanSys2021* satellite at *CCS 2021*, Lyon, France, Oct 2021  
Growing cohesive urban bicycle networks

5th Annual Meeting of the Cycling Research Board, *CRBAM21*, Copenhagen, Denmark, Oct 2021  
The geometric limits of growing urban bicycle networks

1st Annual Meeting of the Cycling Research Board, Amsterdam, Netherlands, Nov 2018  
Cross-city visualization & quantification of the “arrogance of space” using large-scale transport space data

*NetSci 2018* Conference, Paris, France, Jun 2018  
Structural discontinuities of human interactions in space

*Urban Systems and Network Science* satellite at *NetSci 2017*, Indianapolis, USA, Jun 2017  
Interactive, animated exploration of urban mobility spaces through the online platform “What the Street!?”

*CompleNet 2017* Conference, Dubrovnik, Croatia, Mar 2017  
Shareability networks: Quantifying ride-sharing benefits

*IC2S2 2016* Conference, Evanston, USA, Jun 2016  
Exploring the anatomy of physics

*CompleNet 2016* Conference, Dijon, France, Mar 2016  
Quantifying social effects in collaborative work

*ICCSS 2015* Conference, Helsinki, Finland, Jun 2015  
Understanding effort and success in teams

*NetSci 2015* Conference, Zaragoza, Spain, Jun 2015  
Quantifying team effort and success

*CompleNet 2015* Conference, New York City, USA, Mar 2015  
Understanding Team Success

*NetSci 2014* Conference, Berkeley, USA, Jun 2014  
Higher-order models in human mobility and interactions

*Network Frontier Workshop 2013* at Northwestern University, Evanston, USA, Dec 2013  
Taxi-pooling in New York City: A network-based approach to social sharing

*Engaging Data 2013* Conference at MIT, Cambridge, USA, Nov 2013  
Hubcab – Taxi-sharing in New York City: A network-based approach

*ECCS 2013* Conference, Barcelona, Spain, Sep 2013  
Human spatial organization and the emergence of urban centers



ECCS 2013 Conference, Multiplex Networks 2013, Barcelona, Spain, Sep 2013  
Multiplex networks in social systems

Urban Code Conference, Cambridge, USA, Nov 2012  
hubcab – A network-based improved urban taxi service

Ph.D. Defensio at University of Vienna, Austria, Mar 2012  
Statistical physics approaches to large-scale socio-economic networks

ECCS 2011 Conference, Vienna, Austria, Sep 2011  
Human mobility on a network

NetSci 2011 Conference, Budapest, Hungary, Jun 2011  
Multi-relational Socio-economic Networks in a Large-scale Online Community

Net2011 Conference at University Bicocca Milano, Italy, May 2011  
Multi-relational socio-economic networks in a massive multiplayer online game

INSITE Kickoff-Meeting, Venice, Italy, Apr 2011  
The artificial world of the Pardus game: First lessons

7th Vienna Central European Seminar in Particle Physics and Quantum Field Theory, Austria, Nov 2010  
Complex human mobility dynamics on a network

ECCS 2010 Conference, Lisbon, Portugal, Sep 2010  
Multi-relational social dynamics in a large-scale online game society  
Trade, Conflict and Sentiments: Multi-relational organization of large-scale social networks

COST workshop *Processes on Networks* at Medical University of Vienna, Austria, Mar 2010  
Establishment of a large-scale “laboratory” for socio-economic behavior

Workshop *Modelling Science* at Rathenau Institute, Amsterdam, Netherlands, Oct 2009  
Measuring the evolution of socio-economical structure in an online game

DPG Spring Meeting, Dresden, Germany, Mar 2009  
Measuring the evolution of socio-economical structure in an online game

## Academic activities

### *Memberships and foundations*

Co-founder and member of *NETwoRks, Data, and Society (NERDS)* research group at IT University of Copenhagen, [nerds.itu.dk](http://nerds.itu.dk), Denmark, since Apr 2019

### *Editorial service*

Editor at International Journal of Geo-information  
since Aug 2019

Review editor at Frontiers (Social Physics)  
since Jun 2018

Editor at Complex Systems  
since Jan 2018

Editor at PLOS ONE  
since Dec 2017

Handling editor at PLOS ONE collection *Science of Stories*  
Jan 2019 – Jun 2019

Guest Editor at International Journal of Geo-Information, *Human-Centric Data Science for Urban Studies*  
Dec 2017 – Apr 2019

Guest Editor at EPJ Data Science, *Individual and Collective Human Mobility: Description, Modelling, Prediction*  
May 2017 – Jan 2018

### *Review service*

*Journals:* Nature, Nature Communications, Nature Sustainability, PNAS, Science Advances, Nature Computational Science, Physical Review Letters, Physical Review E, New Journal of Physics, Europhysics Letters, Social Networks, Journal of The Royal Society Interface, Royal Society Open Science, Scientific Data, PLOS ONE, Journal of Statistical Mechanics, EPJ Data Science, Condensed Matter Physics, Frontiers, Transportation, Environment and Planning B, Games, ACM Transactions on Knowledge Discovery from Data, IEEE Transactions on Network Science and Engineering, IEEE Transactions on Knowledge and Data Engineering, IEEE Transactions on Signal and Information Processing over Networks, IEEE Transactions on Intelligent Transportation Systems, GeoInformatica, International Journal of Sustainable Transportation, International Journal of Geographical Information Science, Sustainability, Economics Bulletin

*Funding agencies and institutions:* German Research Foundation (DFG), Netherlands Organisation for Scientific Research (NWO), Forum neue Medien Austria, World Bank

### *Academic visits*

ISI Foundation, Turin, Italy, May – Jun 2022

ISI Foundation, Turin, Italy, Oct 2021

ISI Foundation, Turin, Italy, Jun 2019

ISI Foundation, Turin, Italy, Jun – Jul 2018

Northwestern Institute on Complex Systems (NICO), Northwestern University, Evanston, USA, Jul 2017

Center for Complex Network Research, Northeastern University, Boston, USA, Jun – Jul 2017

Center for Network Science, Central European University, Budapest, Hungary, Mar – Apr 2016

Santa Fe Institute, Santa Fe, USA, Oct 2011

Laboratory for Complex Systems, University of Catania, Italy, May – Jun 2011

Chair of Sociology, in particular of Modeling and Simulation, ETH Zürich, Switzerland, Feb – Mar 2011

Laboratory for Complex Systems, University of Catania, Italy, Sep 2010

COST scientific mission at the Institute of Mathematical Sciences, Imperial College London, UK, Aug – Sep 2010

### *Advanced training*

*Graph Exploitation Symposium* at MIT Endicott House, USA, Aug 2014

*Workshop on Information and Decision in Social Networks* at MIT Media Lab, USA, Nov 2012

*Workshop Computational Social Science* at Harvard University, USA, May 2012

*SFI Complex Systems Summer School 2010* at the Santa Fe Institute, USA, Jun 2010

Summer school *Complex Systems and Social Simulation* at the Central European University, Budapest, Hungary, Jul 2009

Summer school *Steps in Evolution* at the Jacobs University Bremen, Germany, Jun 2009

### *Organization and committees*

Co-chair dataset track of ICWSM-22 in Atlanta, USA, Jun 2022

Program Committee member of *Complex Networks 2021* in Madrid, Spain, Nov 2021

Program Committee member of *MIMODE 2021* in Lyon, France, Oct 2021

Program Committee member of CCS 2021 in Lyon, France, Oct 2021  
Program Committee member of IC2S2 2021 in Zurich, Switzerland, Jul 2021  
Program Committee member of CompleNet 2021 online, May 2021  
Program Committee member of SocInfo20 in Pisa, Italy, Oct 2020  
Program Committee member of ICCS 2020 in Nashua, USA, Jul 2020  
Reviewer of Conference Papers of IC2S2 2020 in Cambridge, USA, Jul 2020  
Program Committee member of NetSci 2020 in Rome, Italy, Jul 2020  
Program Committee member of CompleNet 2020 in Exeter, UK, Mar 2020  
Program Committee member of NetSci-X 2020 in Tokyo, Japan, Jan 2020  
Program Committee member of Future Cities Challenge 2019 in Oxford, UK, Jul 2019  
Program Committee member of CompleNet 2019 in Tarragona, Spain, Mar 2019  
Program Committee member of Complex Networks 2018 in Cambridge, UK, Dec 2018  
Program Committee member of CCS 2018 in Thessaloniki, Greece, Sep 2018  
Program Committee member of ICCS 2018 in Cambridge, USA, Jul 2018  
Program Committee member of CompleNet 2018 in Boston, USA, Mar 2018  
Program Committee member of Complex Networks 2017 in Lyon, France, Nov 2017  
Program Committee member of CCS 2017 in Cancun, Mexico, Sep 2017  
Program Committee member of ENIC'17 in Duisburg, Germany, Jul 2017  
Program Committee member of IC2S2 2017 in Cologne, Germany, Jul 2017  
Program Committee member of the ICWSM-17 11th International Conference on Web and Social Media in Montreal, Canada, May 2017  
Program Committee member of COMPLEXIS 2017 in Porto, Portugal, Apr 2017  
Program Committee member of the Social Networks and Graph Analysis Track of the WWW2017 26th International World Wide Web Conference in Perth, Australia, Apr 2017  
Program Committee member of CompleNet 2017 in Dubrovnik, Croatia, Mar 2017  
Program Committee member of Complex Networks 2016 in Milan, Italy, Dec 2016  
Program Committee member of the CCS 2016 Open Science for an Open Society satellite in Amsterdam, Netherlands, Sep 2016  
Program Committee member of the ICWSM-16 10th International Conference on Web and Social Media in Cologne, Germany, May 2016  
Program Committee member of the ICDM2016 Workshop on Data mining for the Analysis of Performance and Success (DAPS 2016) in Cologne, Germany, May 2016  
Program Committee member of the ICWSM-16 10th International Conference on Web and Social Media in Cologne, Germany, May 2016  
Program Committee member of COMPLEXIS 2016 in Rome, Italy, Apr 2016  
Program Committee member of the Social Networks and Graph Analysis Track of the WWW2016 25th International World Wide Web Conference in Montreal, Canada, Apr 2016  
Program Committee member of the CompleNet 2016 Workshop on Complex Networks in Dijon, France, Mar 2016  
Program Committee member of the NetSciX 2016 Conference on Network Science in Wroclaw, Poland, Jan 2016

Program Committee member of the ASONAM 2015 *DyNo Workshop on Dynamics in Networks* in Paris, France, Aug 2015

Program Committee member of the ASONAM 2015 *Industry-Track* in Paris, France, Aug 2015

Program Committee member of the *IEEE BigData Congress 2015* in New York City, USA, Jun 2015

Main organizer and Program Committee member of the NetSci 2015 *Satellite NetSci Backstage* in Zaragoza, Spain, Jun 2015

Program Committee member of the ICWSM-15 *9th International Conference on Web and Social Media* in Oxford, UK, May 2015

Program Committee member of the CompleNet 2015 *Workshop on Complex Networks* in New York City, USA, Mar 2015

Program Committee member of the NetSciX 2015 *Conference on Network Science* in Rio de Janeiro, Brasil, Jan 2015

Program Committee member of the SocInfo 2014 track EGG 2014 *Exploration on Game and Gamers Workshop* in Barcelona, Spain, Nov 2014

Program Committee member of the SDM 2014 *Workshop on Mining Networks and Graphs: A Big Data Analytic Challenge* in Philadelphia, USA, Apr 2014

Organizer at the conference *Engaging Data 2013* at MIT, Cambridge, USA, Nov 2013

Program Committee member of the SDM'14 workshop *Mining Networks and Graphs: A Big Data Analytics Challenge* Philadelphia, USA, Apr 2014

Program Committee member of the 3PGCIC 2013 *Social Network Applications* track at University of Technology of Compiègne, France, Oct 2013

Program Committee member of the ECCS 2013 *Multiplex Networks 2013* satellite in Barcelona, Spain, Sep 2013

Program Committee member of the BRICS-CCI & CBIC 2013 *Complex Systems Symposium* in Recife, Brazil, Sep 2013

Reviewer of Conference Papers of the CUPUM 2013 *13th International Conference on Computers in Urban Planning and Urban Management* in Utrecht, Netherlands, Jul 2013

Organizer at the conference *Urban Code* at MIT, Cambridge, USA, Nov 2012

Program Committee member of the *Symposium on Social Networks and Social Contagion* at the Westin Arlington Gateway, USA, Nov 2012

Main organizer and Program Committee member of the ECCS'11 *Satellite XNet – Complexity & Networks* at the Medical University of Vienna, Austria, Jan – Sep 2011

Main organizer and Program Committee member of the *European Conference on Complex Systems 2011 (ECCS'11)* at the Medical University of Vienna, Austria, Oct 2010 – Sep 2011

Main organizer of COST MP0801 workshop *Processes on Networks* at the Medical University of Vienna, Austria, Mar 2010

## Teaching, supervision, and censor work

### Courses

*Geospatial Data Science* (7.5 ECTS credits, 75%), IT University of Copenhagen, Spring 2022

*Introduction to Data Science and Programming* (15 ECTS credits, 65%), IT University of Copenhagen, Fall 2021/2022

*First Year Project* (15 ECTS credits, 30%), IT University of Copenhagen, Spring 2021

*Introduction to Data Science and Programming* (15 ECTS credits, 65%), IT University of Copenhagen, Fall 2020/2021

*Introduction to Data Science and Programming* (15 ECTS credits, 50%), IT University of Copenhagen, Fall 2019/2020

*Technical Communication* (7.5 ECTS credits), IT University of Copenhagen, Fall 2019/2020

*Data and Network Visualization* (4 ECTS credits), Central European University, Fall 2018/2019

*Urban Networks and Human Mobility* (4 ECTS credits), Central European University, Fall 2018/2019

*Statistical Methods in Network Science and Data Analysis* (8 ECTS credits), Central European University, Winter 2017/2018

Seminar chair at seminar *Understanding Big Data*, European Forum Alpbach 2016, Aug 2016

### *Single classes*

Guest class at *Reflections on Data Science*, ITU Copenhagen, Denmark, Apr 2020

Guest class at *Data and Network Visualization*, Central European University, Budapest, Hungary, Nov 2017

Guest class at *JustData - University Wide Course*, Central European University, Budapest, Hungary, Nov 2017

### *Supervision*

Supervisor of PhD student Ane Rahbek Vierø at ITU Copenhagen, since 2022

Supervisor of PhD student Anastassia Vybornova at ITU Copenhagen, since 2021

Supervisor of Postdoc Bojan Kostic at ITU Copenhagen, since 2021

Co-supervisor of Postdoc Tiago Cunha at ITU Copenhagen, since 2020

Co-supervisor of MSc student Anastassia Vybornova at ITU Copenhagen, 2021

Supervisor of MSc students Cecilia Laura Kolding Andersen and Morten Lynghede at ITU Copenhagen, 2021

Supervisor of BA students Edi Begovic and Høgni Ziska Maree Jacobsen at ITU Copenhagen, 2021

Supervisor of Lagrange scholar (Post-MSc level) Marina Klanjčić at ISI Foundation, 2019-2021

Supervisor of PhD student Luis Guillermo Natera Orozco at CEU, 2018-2021

Supervisor of MSc student Albert-Hose Llebaria Holda at ITU Copenhagen, 2020

Supervisor of BA student Martin Bedsted Villandsen at ITU Copenhagen, 2020

Co-supervisor of PhD students, master students, interns, at Medical University Vienna and MIT

### *Censor work*

Examiner for the computer science study programs in Denmark, since April 2022

Examiner for the linguistic and cognitive study programs in Denmark, since June 2021

PhD defense reviewer at University of Copenhagen, Denmark, Oct 2021

PhD defense reviewer at Scuola Normale Superiore di Pisa, Italy, Jul 2020

PhD defense reviewer at Universitat de les Illes Balears, Palma, Spain, Jul 2019

PhD defense reviewer at Aalto University, Helsinki, Finland, Aug 2018

PhD defense examiner at Eötvös Loránd University, Budapest, Hungary, Mar 2017

## External research funding

PI in Danish Ministry of Transport “Cykelpuljen” grant *Netværksanalyse af den danske cykelinfrastruktur*, with PhD student Ane Rahbek Vierø, Jan 2022 – Dec 2024

Co-leader in a sub-award of the Templeton grant *Using Big Data to Quantify and Cultivate Genius*, with Albert-László Barabási, Roberta Sinatra, Cesar Hidalgo, Sep 2018 – Aug 2021

The sub-award was won but declined.

Premium postdoctoral researcher in the Hungarian Academy of Sciences (MTA) grant *Conflict and Controversy in Large Social Networks*, Sep 2016 – Sep 2019

Due to assuming an Assistant Professor position at CEU, I discontinued this grant in Oct 2017.

Key research personnel in the Air Force Office of Scientific Research (AFOSR) grant *The Fundamentals of Predictability of Scientific Success*, with Albert-László Barabási, Alessandro Vespignani, Roberta Sinatra, Feb 2015

Key research personnel in the Austrian Science Fund (FWF) project P23378, *Quantifying socio-economic multiplex networks in a massive multiplayer online game*, with Stefan Thurner, Sep 2011 – Oct 2015

Although this grant was funded, I did not assume the position due to my move to Boston (MIT) in 2012.

## Travel and other grants

CEU ACRO Teaching development grant, Dec 2017

Industry support for organizing NetSci 2015 satellite NetSci Backstage, Jun 2015

Travel and accommodation support to one-month academic visit by ETH Zurich, Feb 2011

Travel grant from Österreichische Forschungsgemeinschaft to ECCS 2010, Sep 2010

Travel grant from the European Cooperation in Science and Technology, Action MP0801 Physics of Competition and Conflicts, to two-month academic visit to Imperial College, Aug-Sep 2010

Full travel and accommodation grant from Santa Fe Institute for three-week SFI Complex Systems Summer School 2010, Jun 2010

## In the media

My research and projects have been featured in, among others:

The New York Times, Le Monde, Scientific American, MIT Technology Review, MIT Frontpage Spotlight, MIT News, Nature News, Science News, National Geographic, Frankfurter Allgemeine Zeitung, The Guardian, Fast Company, The Huffington Post, Der Spiegel, Forbes, Newsweek, NBC News, The Atlantic, Citylab, Bild der Wissenschaft, Fortune, Ingeniøren / Mobilitytech, Yahoo! Finance, New York Magazine, Salon, Physorg, IEEE Spectrum, Quattroruote, Il sole 24 ore, La Stampa, Science Daily, Neue Zürcher Zeitung, 20 Minuten, Público, Austrian National Radio Ö1, Austrian National Radio FM4, ORF Science, Der Standard, Die Presse, Wiener Zeitung, Salzburger Nachrichten, OÖ Nachrichten, Kleine Zeitung

## Awards and exhibitions

Permanent exhibition of *What the Street!?* in Futurium in Berlin, Germany, from Sep 2019

City Vis 2018 award in Art & Advocacy for *What the Street!?*, and exhibition in Berlin, Germany, Oct 2018