

Markus Schläpfer

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Children: 1 daughter (2016)

ACADEMIC POSITIONS

08.2021 – present	Senior Research Associate / Co-lead ‘Digital transformation’ University of Bern (Switzerland) Center for Regional Economic Development
12.2016 – present	Assistant Professor (adjunct) Nanyang Technological University (Singapore) School of Computer Science and Engineering
02.2016 – present	Principal Investigator ETH Future Cities Laboratory (Singapore)
07.2014 – 12.2015	SFI Postdoctoral Fellow Santa Fe Institute (USA)
01.2014 – 06.2014	Visiting Researcher Santa Fe Institute
06.2013 – 12.2013	Visiting Researcher Singapore-MIT Alliance for Research and Technology (Singapore)
04.2011 – 05.2013	Post-Doctoral Researcher and Area Co-lead ‘Network and Society’ Massachusetts Institute of Technology (USA)
09.2010 – 01.2011	Research Assistant ETH Zurich (Switzerland)

EXTERNAL CONSULTING

04.2020 – 02.2021	Ministry of National Development / Urban Redevelopment Authority (Singapore)
04.2020 – 10.2020	Human Computation Institute (USA)
01.2011 – 12.2011	Fraunhofer Institute (Germany)
08.2003 – 02.2006	International Risk Governance Council (Switzerland)

EDUCATION

08.2010	Ph.D. in Mechanical and Process Engineering ETH Zurich (Switzerland)
04.2003	M.Sc. in Environmental Engineering ETH Zurich (Switzerland)

PRIZES

2021	Finalist, Science Breakthrough of the Year, Falling Walls Berlin
2015	Winner, First Prize (best overall), ‘Data for Development’ (D4D) Challenge (prestigious award, with more than 150 universities worldwide competing)
2015	Winner, Energy Prize, ‘Data for Development’ (D4D) Challenge

2015	Finalist, Telecom Italia Big Data Challenge 2015
2015	Winner, Best Poster Award, UK Annual Review Meeting on Air Pollution Research

RESEARCH GRANTS

Recommended for funding (Review Board decision)	Principal Investigator – Resource-Efficient Urban Intensification: A Complexity Science Approach (research module of the ETH Future Cities Laboratory), to be funded by the Singapore National Research Foundation
01.2021 – present	Principal Investigator – Powering the City: Urban Building Integrated Photovoltaics (research module of the ETH Future Cities Laboratory), funded by the Singapore National Research Foundation (with Prof. Arno Schlüeter)
06.2020 – 02.2021	Principal Investigator – How Do Urban Heat and Air Pollution Affect Singapore’s Network of Spatial Interactions? Funded by the Ministry of National Development of Singapore
01.2020 – present	Co-Principal Investigator – The Hidden Consequences of Digitalization for the Spatial Economy, funded by the Swiss National Science Foundation (stepped back for self-funding; Principal Investigator: Prof. Maximilian von Ehrlich)
10.2018 – 05.2019	Principal Investigator – Using Mobile Phone Data for Electrification Planning in Developing Countries, funded by Orange Labs, France
09.2015 – 08.2020	Principal Investigator – Big Data Informed Urban Design and Governance (research module of the ETH Future Cities Laboratory), funded by the Singapore National Research Foundation (with Prof. Gerhard Schmitt and Prof. Bige Tunçer)
07.2009	Recipient – Swisselectric Research Grant

SUPERVISION

Postdoc	Hadrien Salat ETH Future Cities Laboratory Supervisor
PhD	Aike A. Steentoft (ongoing) Nanyang Technological University, School of Computer Science and Engineering Supervisor
Research Assistants	Aike A. Steentoft, Nhu Phuong Nguyen ETH Future Cities Laboratory Supervisor
Final Year Projects	Chew Hong Jun (ongoing) Nanyang Technological University, School of Computer Science and Engineering Supervisor Stefan Selvarajoo, Tang Hoong Jing Nanyang Technological University, School of Computer Science and Engineering Co-Supervisor
Master theses	Peter Müller, Tom Kessler, Pascal Kienast, David Henzi ETH Zurich, Department of Mechanical and Process Engineering Co-Supervisor

Others	<p>Eduardo Gomes Visiting PhD student, ETH Future Cities Laboratory Supervisor</p> <p>Maurice Bokanga Undergraduate Research Fellow, Santa Fe Institute Mentor</p> <p>Andrew Jeanguenat, Jesse Triplett Undergraduate Research Opportunities Program, Massachusetts Institute of Technology Mentor</p>
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UNIVERSITY TEACHING

2017 – present	<p>Lecturer ETH Zurich (Switzerland), Massive Open Online Course (MOOC) on Smart and Responsive Cities</p>
03.2016 – present	<p>Guest Lecturer Nanyang Technological University (Singapore), School of Computer Science and Engineering</p>
03.2006 – 08.2010	<p>Guest Lecturer ETH Zurich (Switzerland), Department of Mechanical and Process Engineering and Department of Environmental Systems Science</p>

REVIEWING

Nature Communications, Proceedings of the National Academy of Sciences, Environmental Science & Technology, Energy and Buildings, Environment and Planning B, American Sociological Review, Journal of the Royal Society Interface, Royal Society Open Science, PloS ONE, EPJ Data Science, Complexity, Europhysics Letters, Journal of Statistical Mechanics, IEEE Systems Journal, IEEE Transactions on Power Systems, Journal of Geographical Systems, Journal of Urban Health, Safety Science, Transportation.

Swiss National Science Foundation, Fonds de la Recherche Scientifique (F.R.S.-FNRS) Belgium, Vienna Science and Technology Fund (WWTF) Austria

MEDIA COVERAGE

New York Times, Le Monde, Frankfurter Allgemeine Zeitung, El País, Público, The Atlantic, Quartz, Der Spiegel, New Statesman, Scientific American (forthcoming), MIT Technology Review, Bild der Wissenschaft, Physics World, Phys.org, Science Daily, Nature News, MIT News, ETH Zurich News, NTU News, Project Syndicate, Cosmos Magazine, Vice, ORF Science, 20 Minuten, Deutschlandfunk Nova, Methodisch inkorrekt! (podcast), Datenbusiness Podcast

LANGUAGES

German / Swiss German	Native
English, French	Fluent
Spanish, Italian	Basic

JOURNAL ARTICLES

- A18 **M. Schläpfer**, J. Lee and L. M. A. Bettencourt
The 3D form of cities is a key determinant of building energy use
(Nature Sustainability, pre-submission accepted)
- A17 H. Salat, **M. Schläpfer**, Z. Smoreda and S. Rubrichi
Analysing the impact of electrification on rural attractiveness in Senegal with mobile phone data
Royal Society Open Science (accepted)
- A16 **M. Schläpfer**, L. Dong, K. O’Keeffe, P. Santi, M. Szell, H. Salat, S. Anklesaria, M. Vazifeh, C. Ratti and G. B. West
The universal visitation law of human mobility
Nature, Vol. 593, 522 (2021)
- A15 G. Manoli, S. Fatichi, **M. Schläpfer**, K. Yu, T. Crowther, N. Meili, P. Burlando, G. Katul and E. Bou-Zeid
Reply to Martilli et al. (2020): Summer average urban-rural surface temperature differences do not indicate the need for urban heat reduction
OFS preprint (2020)
- A14 H. Salat, Z. Smoreda and **M. Schläpfer**
Mobile phone data's potential for informing infrastructure planning in developing countries
Plos One, Vol. 15, e0235224 (2020)
- A13 E. Gomes, A. Banos, P. Abrantes, J. Rocha, **M. Schläpfer**
Future land use changes in a peri-urban context: Local stakeholder views
Science of the Total Environment, Vol. 718, 137381 (2020)
- A12 G. Manoli, S. Fatichi, **M. Schläpfer**, K. Yu, T. Crowther, N. Meili, P. Burlando, G. Katul, E. Bou-Zeid
Magnitude of urban heat islands largely explained by climate and population
Nature, Vol. 573, 55 (2019)
- A11 A. Steentoft, A. Poorthuis, B. Lee and **M. Schläpfer**
The canary in the city: Indicator groups as predictors of local rent increases
EPJ Data Science, Vol. 7, 1 (2018)
- A10 C. Zhong, **M. Schläpfer**, S. Müller Arisona, C. Ratti, M. Batty and G. Schmitt
Revealing centrality in the spatial structure of cities from human activity patterns
Urban Studies, Vol. 54, 437 (2017)
- A9 **M. Schläpfer**, L. M. A. Bettencourt, S. Grauwin, M. Raschke, R. Claxton, Z. Smoreda, G. B. West and C. Ratti
The scaling of human interactions with city size
Journal of the Royal Society Interface, Vol. 11, 20130789 (2014)
- A8 M. Raschke, **M. Schläpfer** and K. Trantopoulos
Copula-based modeling of degree-correlated networks
Journal of Statistical Mechanics: Theory and Experiment, P02019 (2014)
- A7 **M. Schläpfer** and L. Buzna
Decelerated spreading in degree-correlated networks
Physical Review E, Vol. 85, 015101 (2012), Rapid Communication
- A6 **M. Schläpfer** and P. Mancarella
Probabilistic modeling and simulation of transmission line temperatures under fluctuating power flows
IEEE Transactions on Power Delivery, Vol. 26, 2235 (2011)
- A5 K. Trantopoulos, **M. Schläpfer** and D. Helbing
Toward sustainability of complex urban systems through socio-technical reality mining
Environmental Science and Technology, Vol. 45, 6231 (2011)
- A4 M. Raschke, **M. Schläpfer** and R. Nibali
Measuring degree-degree association in networks
Physical Review E, Vol. 82, 037102 (2010)

- A3 **M. Schlöpfer** and K. Trantopoulos,
Lattice splitting under intermittent flows
Physical Review E, Vol. 81, 056106 (2010)
- A2 **M. Schlöpfer** and J. L. Shapiro
Modeling failure propagation in large-scale engineering networks
ICST Lecture Notes, Vol. 5 (2009)
- A1 I. Eusgeld, W. Kröger, G. Sansavini, **M. Schlöpfer** and E. Zio (authors ordered alphabetically)
The role of network theory and object-oriented modeling within a framework for the vulnerability analysis of critical infrastructures
Reliability Engineering & System Safety, Vol. 94, 954 (2009)

PEER-REVIEWED CONFERENCE PROCEEDINGS

- C8 S. Selvarajoo, **M. Schlöpfer** and R. Tan
Urban electric load forecasting with mobile phone location data
in Proceedings of the Asian Conference on Energy, Power and Transportation Electrification (ACEPT)
30 October-2 November 2018, Singapore, Singapore
- C7 E. Prawirodidjojo, R. Quek, B. Lee, V. Gauthier and **M. Schlöpfer**
Using mobile phone data to determine human mobility patterns in Paris
in Proceedings of the International Conference on Cyberworlds (CW)
3-5 October 2018, Singapore, Singapore
- C6 P. Herthogs, B. Tunçer, **M. Schlöpfer** and P. He
A weighted graph model to estimate people's presence in public space
in Proceedings of the Annual Conference on Education and Research in Computer Aided Architectural Design in Europe (eCAADe)
17-21 September 2018, Lodz, Poland
- C5 P. Hines, S. Blumsack and **M. Schlöpfer**
When are decentralized infrastructure networks preferable to centralized ones?
in Proceedings of the 50th Hawaii International Conference on System Sciences (HICSS 2017)
4-7 January 2017, Waikoloa, USA
- C4 E. A. Martinez-Cesena, P. Mancarella, M. Ndiaye and **M. Schlöpfer**
Using mobile phone data for electricity infrastructure planning
in Proceedings of the Conference on the Analysis of Mobile Phone Networks (NetMob)
8-10 April 2015, Cambridge, USA
(First Prize (best overall) and Energy Prize of the 'Data for Development' Challenge)
- C3 **M. Schlöpfer**, S. Dietz and M. Kaegi
Stress induced degradation dynamics in complex networks
in Proceedings of the IEEE International Conference on Infrastructure Systems
10-12 November 2008, Rotterdam, The Netherlands
- C2 **M. Schlöpfer**
Risk of line overloads in power systems with stochastic generation
in Proceedings of the Smart Energy Strategies Conference
8-10 September 2008, Zurich, Switzerland
- C1 **M. Schlöpfer**, T. Kessler and W. Kröger
Reliability analysis of electric power systems using an object-oriented hybrid modeling approach
in Proceedings of the 16th Power Systems Computation Conference
14-18 July 2008, Glasgow, UK

BOOK CHAPTERS

- B7 M. Schläpfer**
Understanding cities through urban complexity
 in S. Cairns and D. Tunas (Eds.): Future Cities Laboratory – Indicia 03
 Zurich, Switzerland: Lars Müller (2021, in press)
- B6 P. Herthogs, F. Clavier, K. Knecht, J. Mueller, Z. Drillet, Y. Miao, K. Konieva, A. Steentoft, G. Schrotter, R. Koenig, M. Schläpfer, B. Tunçer and G. Schmitt**
Big data-informed urban design and governance
 in S. Cairns and D. Tunas (Eds.): Future Cities Laboratory – Indicia 02
 Zurich, Switzerland: Lars Müller (2019)
- B5 M. Schläpfer**
Urban complexity
 in G. Schmitt, E. Tapias and M. H. Wisniewska (Eds.): City in your hands
 Zurich, Switzerland: ETH Zurich (2018)
- B4 G. Schmitt, B. Klein, R. Koenig, M. Schläpfer, B. Tunçer and P. Bus**
Big data-informed urban design
 in S. Cairns and D. Tunas (Eds.): Future Cities Laboratory – Indicia 01
 Zurich, Switzerland: Lars Müller (2016)
- B3 M. Schläpfer**
How polycentric are our cities?
 in C. Ratti and D. Offenhuber (Eds.): Decoding the city – urbanism in the age of big data
 Basel, CH: Birkhäuser (2014) (extended English edition)
- B2 M. Schläpfer and K. Trantopoulos**
Agent-based modeling and simulation
 in W. Kröger and E. Zio (Eds.): Vulnerable systems
 London, UK: Springer (2011)
- B1 M. Schläpfer and H. Glavitsch**
Learning from the past: electric power blackouts and near misses in Europe
 in A. Gheorghe, M. Masera, M. Weijnen and L. De Vries (Eds.): Critical infrastructures at risk –
 Securing the European electric power system.
 Dordrecht, The Netherlands: Springer (2006)

CONFERENCE TALKS/POSTERS

- 2021 European Meeting of the Urban Economics Association, Copenhagen, Denmark (presented by Pierre Magontier)
- 2020 TEDx NTU – A World Reimagined (invited)
- 2020 NTU Complexity Community Sharing Session, Nanyang Technological University, Singapore (invited)
- 2019 Conference on Complex Systems, Nanyang Technological University, Singapore (invited)
- 2019 ANU Engineering and Computer Science Seminar, Australian National University, Australia (invited)
- 2018 Treffpunkt Science City, ETH Zurich, Zurich, Switzerland (invited)
- 2018 Science of Cities Studio, Santa Fe Institute, Santa Fe, USA (invited)
- 2018 6th AAAI Conference on Human Computation and Crowdsourcing, University of Zurich, Zurich, Switzerland (invited)
- 2018 World Cities Summit, Singapore (poster)
- 2017 International Land Use Symposium 2017, Leibnitz Institute of Ecological Urban and Regional Development, Dresden, Germany (invited)

- 2017 NTU Complexity Community Sharing Session, Nanyang Technological University, Singapore (invited)
- 2017 Langenburg Forum 2017, Transforming Megacities - How Digitisation Can Help Create Sustainable Living Environments for 9bn People, Langenburg, Germany (invited)
- 2017 DPG (Deutsche Physikalische Gesellschaft) Spring Meeting, Dresden, Germany
- 2016 Conference on Complex Systems, Amsterdam, The Netherlands
- 2016 Urban Systems Day, Graz University of Technology, Graz, Austria (invited)
- 2016 NTU Complexity Community Sharing Session, Nanyang Technological University, Singapore (invited)
- 2015 UK Annual Review Meeting on Outdoor and Indoor Air Pollution Research (best poster award) Solihull, UK
- 2015 Telecom Italia Big Data Challenge, Big Data Jam (invited finalist), Rome, Italy
- 2015 Minerva Meeting and Program Review, Washington DC, USA (invited)
- 2015 Workshop on Big Data, Complexity, and Urban Development, Complexity Science Hub Vienna, Vienna, Austria (invited)
- 2015 Conference on the Analysis of Mobile Phone Networks (NetMob 2015), Massachusetts Institute of Technology, Cambridge, USA (invited)
- 2015 Reinventing the Grid: Designing Resilient, Adaptive and Creative Power Structures (Workshop) Santa Fe Institute, Santa Fe, USA (invited)
- 2014 The Principles of Complexity: Life, Scale and Civilization (Workshop) Santa Fe Institute, Santa Fe, USA (invited)
- 2014 International School and Conference on Network Science (NetSci 2014), University of California, Berkeley, USA
- 2014 American Mathematical Society, Western Spring Sectional Meeting, University of New Mexico, Albuquerque, USA (invited)
- 2014 4th Future Urban Mobility Symposium, National University of Singapore, Singapore
- 2013 How far can 'Big Data' take us towards understanding cities? Santa Fe Institute, Santa Fe, USA (invited)
- 2012 Urban Code Conference, Massachusetts Institute of Technology, Cambridge, USA
- 2012 Can There Be a Science of Cities? (Workshop), Santa Fe Institute, Santa Fe, USA (invited)
- 2011 Complex-City Workshop, Tinbergen Institute, Amsterdam, The Netherlands
- 2011 Forum on Future Cities, Massachusetts Institute of Technology, Cambridge, USA
- 2010 International School and Conference on Network Science (NetSci 2010), Massachusetts Institute of Technology, Cambridge, USA
- 2009 Complex'2009, University of Shanghai for Science and Technology, Shanghai, China
- 2008 IEEE International Conference on Infrastructure Systems, De Doelen Congress Centre, Rotterdam, The Netherlands
- 2008 Smart Energy Strategies, ETH Zurich, Zurich, Switzerland
- 2008 16th Power Systems Computation Conference, University of Strathclyde, Glasgow, UK
- 2007 European Conference on Complex Systems, Dresden University of Technology, Dresden, Germany

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