

MICHAEL T. GASTNER

CONTACT INFORMATION

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PERSONAL PROFILE

Applied mathematician and data scientist with a specialisation in data visualisation, cartography, network analysis and mathematical modelling. Originator of the go-cart.io project, which makes cartogram generation easy and user-friendly. Internationally experienced educator at the undergraduate and postgraduate level.

ACADEMIC POSITIONS

<i>Current</i> SINCE JUL 2015	Yale-NUS College (Singapore): Assistant Professor <i>Mathematical, Computational and Statistical Sciences</i> Yale-NUS is a selective liberal arts and science college. I supervise undergraduate research culminating in “Capstone Projects” in the students’ senior year. Many projects have led to peer-reviewed publications. I also teach and design modules for the “Common Curriculum” and specialised elective courses.
JUN 2015 – NOV 2013	Hungarian Academy of Sciences (Budapest): Marie Curie Fellow <i>Institute of Technical Physics and Materials Science</i> Independent research in statistical physics, network analysis and game theory.
OCT 2013 – SEP 2012	University of Bristol (UK): Lecturer <i>Department of Engineering Mathematics</i> Independent research in applied mathematics. Lecturer for undergraduate and postgraduate courses.
AUG 2012 – DEC 2009	Imperial College (London): Junior Research Fellow <i>Mathematics Department</i> Independent research in complexity and network science. Lecturer for postgraduate courses.
NOV 2009 – MAY 2008	Carl von Ossietzky Universität, Oldenburg (Germany): Research Fellow <i>Institute for Chemistry and Biology of the Marine Environment</i> Mathematical modelling of bioinvasion mediated by the network of cargo ships, supported by a Computational Science Fellowship of the Volkswagen Foundation.
MAY 2008 – OCT 2005	Santa Fe Institute (USA): Postdoctoral Fellow Independent research in complex systems and interdisciplinary science.

QUALIFICATIONS

AUG 2005 – SEP 2000	University of Michigan (USA): Ph.D. <i>Physics Department</i> Advisor: Prof. M. E. J. Newman Thesis: “Spatial distributions—density-equalizing maps, facility location, and two-dimensional networks”
JUL 2000 – OCT 1997	Albert-Ludwigs-Universität Freiburg (Germany): Vordiplom <i>Physics Department</i> Average mark: 1.0 (best possible mark on a scale from 1.0 to 6.0)

SELECTED PUBLICATIONS

See page 10 for complete publication list

- | | |
|-------------------------------------|--|
| INTERACTIVE
CARTOGRAMS | <p>I. K. Duncan, S. Tingsheng, S. T. Perrault and M. T. Gastner
 Task-based effectiveness of interactive contiguous area cartograms
 <i>IEEE Trans. Vis. Comput. Graph.</i> 27(3):2136–2152 (2021)
 DOI: 10.1109/TVCG.2020.3041745</p> <p>Cartograms are map-based data visualisations in which the area of each map region is proportional to an associated numeric data value (e.g. population or gross domestic product). Because of their distorted appearance, cartograms are sometimes criticised for being difficult to read. We conducted an experiment to evaluate whether cartograms are more legible if they are accompanied by interactive animations, linked brushing and infotips. We found that interactivity has the potential to make cartograms accessible even for those readers who are unfamiliar with interactive computer graphics or do not have a prior affinity to working with maps.</p> |
| FAST
CARTOGRAM
ALGORITHM | <p>M. T. Gastner, V. Seguy and P. More
 Fast flow-based algorithm for creating density-equalizing map projections
 <i>Proc. Natl. Acad. Sci. U.S.A.</i> 115(10):E2156–E2164 (2018)
 DOI: 10.1073/pnas.1712674115</p> <p>Prior to this publication, cartogram algorithms had generally been cumbersome or slow. Here we described and benchmarked a new algorithm that can compute cartograms in a matter of seconds.</p> |
| NETWORK
ANALYSIS | <p>P. Kaluza, A. Kölzsch, M. T. Gastner and B. Blasius
 The complex network of global cargo ship movements
 <i>J. Royal Soc. Interface</i> 7(48):1093–1103 (2010)
 DOI: 10.1098/rsif.2009.0495</p> <p>The global network of merchant ships plays a crucial role in human mobility, the exchange of goods and the spread of invasive species. We used information about the itineraries of cargo ships in 2007 to construct and analyse the network of links between ports.</p> |
| DIFFUSION
CARTOGRAM
ALGORITHM | <p>M. T. Gastner and M. E. J. Newman
 Diffusion-based method for producing density-equalizing maps
 <i>Proc. Natl. Acad. Sci. U.S.A.</i> 101(20):7499–7504 (2004)
 DOI: 10.1073/pnas.0400280101</p> <p>We presented a technique to create cartograms based on a physics-inspired model in which a spatial density undergoes Fickian diffusion. As the density equilibrates, it creates a velocity field that defines a continuous map projection. The cartogram is constructed by applying this map projection to the vertices of the multipolygons that represent the geographic regions.</p> |

TEACHING EXPERIENCE

Data Analysis and Visualization with R

Yale-NUS College (2021, 2019, 2018, 2016)

This course teaches how to use the programming language R for data analysis and visualisation. Starting from the fundamentals of R, students learn how to write their own R programs. Hands-on instructions show how to speed up programming with the integrated development environment RStudio and the Tidyverse suite of R packages. Real-world data sets are used to demonstrate how to extract information and present it effectively (e.g. as networks or geographic maps). This course applies the pedagogy of team-based learning with an emphasis on giving and receiving feedback through peer review.

Quantitative Reasoning

Yale-NUS College (2020, 2019, 2017, 2016)

This “Common Curriculum” course aims to develop the students’ skills in logical and statistical reasoning so that they become critical and informed readers of quantitative data. Students learn to criticise and question empirical claims, support them with logical arguments and address real-life problems by gathering and visually representing quantitative data. The course applies the pedagogy of team-based learning to ensure that students who bring diverse talents and backgrounds to the course can learn together and from each other.

TEACHING EXPERIENCE (CONTINUED)

Monte Carlo Simulations in Science and Statistics

Yale-NUS College (2017)

This course teaches how to write elegant and efficient Monte Carlo simulations for concrete real-world examples. Students also learn the theoretical foundations of pseudorandom number generators, Markov chain Monte Carlo methods and the Metropolis-Hastings algorithm.

Stochastic Processes and Models

Yale-NUS College (2017, 2016)

In this course, students learn the mathematics behind the most common models of stochastic processes: Markov chains, Poisson and renewal processes, and queuing theory. Students learn how to prove the most important mathematical results and apply them to realistic problems.

Evolutionary Game Theory

Eötvös Loránd University, Budapest (2014)

In this course, students learn basic concepts of evolutionary game theory: payoff matrix, pure and mixed strategies, different notions of equilibria and their stability.

Engineering Mathematics

University of Bristol (2013)

This two-semester course aims to bring all students entering the Faculty of Engineering up to a common standard in mathematics. The course contains those elements of classical engineering mathematics that universally underpin the formation of the professional engineer. Topics include algebra, analysis, calculus, differential equations, probability and statistics.

Networks: Theory and Applications

Imperial College London (2011)

This course introduces the mathematical theory of networks with applications to social networks, the Internet, transportation and biology. Topics include graph theory, algorithms and mathematical models of networks, especially random graph models. The objective is to develop the mathematics of network-driven processes (e.g. traffic flows, epidemiology and web search engines) and apply the theory to real data.

I have also taught the following courses.

- *Statistical Computing*, Yale-NUS College (2016)
- *Statistical Programming*, Yale-NUS College (2015)
- *Network Flow Algorithms*, University of Bristol (2012)
- *PhD school “Networks and Medical Imaging”*, University of Namur, Belgium (2012)
- *Stochastic Spatial Models in Ecology*, Imperial College London (2012)
- *Mathematics I for Civil Engineers*, Imperial College London (2012)
- *Networks Winter School*, University of Warwick (2011)
- *Biological Modelling*, Universität Oldenburg, Germany (2008)
- *Graduate Workshop in Social Science*, Santa Fe Institute, USA (2006)
- Graduate Student Instructor, University of Michigan (2001–2003)
 - Introductory Mechanics and Sound Laboratory
 - Introductory Electricity and Light Laboratory
 - Elementary Laboratory II (Electricity and Magnetism)

AWARDS AND FELLOWSHIPS

Yale-NUS College Annual Research Recognition Award (2021)

Awarded for faculty-student collaboration.

Student recipients: Ian K. Duncan and S. Tingsheng (S\$ 5000 research grant + S\$ 500 prize for each recipient)

FP7 Marie Curie Fellowship (2013–2015)

Competitive intra-European fellowship (total support: € 184,000)

AWARDS AND FELLOWSHIPS (CONTINUED)

Imperial College Junior Research Fellowship (2009–2012)

Independent fellowship that aims to select world-class early-career researchers through a rigorous three-stage review process in open competition (total support: £ 122,000)

Computational Science Fellowship of the German Volkswagen Foundation (2009)

Independent fellowship that supports junior researchers in theoretical and computer-based disciplines, selected by an international review panel (total support: € 201,000)

Wirt and Mary Cornwell Prize (2004)

Awarded to Ph.D. students who have “demonstrated greatest intellectual curiosity, given most promise of original study and creative work” (\$10,000 cash award)

Postdoctoral Fellowship, Santa Fe Institute (2005–2008)

Highly competitive fellowship that aims to “prepare fellows to be leaders in transdisciplinary science” (salary + \$12,000 research expenses)

Max Kade Foundation Scholarship (2000–2001)

Competitive fellowship to promote German-US educational exchange (tuition fees + monthly stipend)

RESEARCH GRANTS

Yale-NUS Special Pockets Research Grant (2021)

“Topological colouring algorithm for cartograms” (S\$ 1500)

Yale-NUS Special Pockets Research Grant (2020)

“Implementing topology-aware cartogram software” (S\$ 1500)

Singapore Ministry of Education Academic Research Fund Tier 1 (2019-2022)

“Developing the web application go-cart.io for generating cartograms” (S\$ 86,811)

Yale-NUS Research Cluster Seminar Grant (2016)

S\$ 19,600 support for workshops and conferences

Yale-NUS Startup Grant (2016–2020)

S\$ 60,000 for research on networks and cartography

Building Global Engagements in Research (2012–2013)

Competitively awarded internal responsive mode funding at the University of Bristol (£ 3440 travel award)

Rackham Dissertation Grant (2005)

Awarded by the University of Michigan for exceptionally promising Ph.D. dissertation projects (tuition fees + monthly stipend)

INVITED POSITIONS

DEC 2018 –	Hungarian Academy of Sciences (Budapest): Visiting Senior Research Fellow <i>Center for Social Sciences, RECENS research group</i>
OCT 2018	

MAY 2008 –	University of New Mexico (USA): Visiting Postdoctoral Researcher <i>Department of Computer Science</i>
JAN 2008	

SEMINARS, CONFERENCE PRESENTATIONS AND WORKSHOPS

Keynote Speech

- DEC 2018 | *A fast flow-based algorithm for creating density-equalizing map projections*
3rd Asia-Pacific Conference on Complex Systems Design and Management, Singapore

Other Invited Talks since 2016

- JUN 2021 | *Cartograms for spatiotemporal visualization*
Workshop on Data Science and Curation: Spatial Data Science, Indian Statistical Institute, Bengaluru
- JUN 2021 | *Cartograms: the past, the present and the future*
Colloquium, Institute for Geography, University of Augsburg, Germany
- OCT 2020 | *Conveying geospatial information with contiguous area cartograms*
Seminar, Biology Department, Hong Kong Baptist University
- MAR 2020 | *Cartograms: geographic maps reimaged*
Seminar, Computer Science Department, University of Iceland, Reykjavik
- FEB 2020 | *Bringing cartograms to the masses*
Complexity Community Sharing Session, Nanyang Technological University, Singapore
- JAN 2020 | *Contiguous area cartograms*
Seminar, Geography Department, University of Zurich, Switzerland
- OCT 2019 | *Contiguous area cartograms for data visualization and analysis*
Satellite meeting: Extracting and analysing networks from spatio-temporal data, Conference on Complex Systems, Singapore
- SEP 2019 | *Network analysis with R*
Workshop on Complex Networks and Persistent Homology, National University of Malaysia, Bangi
- OCT 2018 | *Consensus time in a voter model with concealed and publicly expressed opinions*
Seminar, "Lendület" Research Center for Educational and Network Studies (RECENS), Hungarian Academy of Sciences, Budapest
- OCT 2018 | *Voter model with concealed and publicly expressed opinions*
Complexity and Networks Group, Imperial College London, UK
- JAN 2018 | *A fast flow-based algorithm for creating density-equalizing map projections*
Complexity Community Sharing Session, Nanyang Technological University, Singapore
- DEC 2017 | *A fast flow-based algorithm for creating density-equalizing map projections*
Seminar, Complexity Science Hub Vienna, Austria
- JUL 2016 | *Density-equalizing map projections - the past, the present and the future*
Workshop on Cities as Complex Systems, Herrenhausen Palace, Hannover, Germany

Recent Contributed Conference Talks

- SEP 2020 | *Beyond Fortune 500: Women in a global network of directors*
NetSci, Rome, Italy

SEMINARS, CONFERENCE PRESENTATIONS AND WORKSHOP (CONTINUED)

DEC 2019		<i>Mean consensus time of the voter model on networks partitioned into two cliques of arbitrary sizes</i> Complex Networks, Lisbon, Portugal
OCT 2019		<i>Mean consensus time of the voter model on networks with two cliques</i> Conference on Complex Systems, Singapore
JUL 2019		<i>go-cart.io: a web application for generating contiguous cartograms</i> International Cartographic Conference, Tokyo, Japan
SEP 2018		<i>A voter model with concealed and publicly expressed opinions</i> Conference on Complex Systems, Thessaloniki, Greece
JUL 2018		<i>Implementing a fast flow-based algorithm for creating cartograms</i> Data Science, Statistics and Visualization, Vienna, Austria

SELECTED MEDIA COVERAGE

About my work on cartograms

| *Sage Perspectives* (7 May 2021)

“Everybody is talking about vaccines, but who on earth gets them?”

<https://tinyurl.com/talkingAboutVaccines>

| *Latest @ Yale-NUS* (16 Apr 2021)

Faculty-student research collaboration tackles inequality in vaccine distribution.

<https://www.yale-nus.edu.sg/newsroom/faculty-student-research-collaboration-tackles-inequality-in-vaccine-distribution/>

| *Der Spiegel* (4 Apr 2021)

So haben Sie die Welt noch nicht gesehen

<https://www.spiegel.de/ausland/die-erde-in-karten-so-haben-sie-die-welt-noch-nicht-gesehen-a-4b03cf99-672c-41f1-a846-1cee641215dd>

| *Latest @ Yale-NUS* (4 Apr 2018)

Yale-NUS faculty member and student collaborate on cartographic research

<https://www.yale-nus.edu.sg/newsroom/4-april-2018-yale-nus-faculty-member-and-student-collaborate-on-cartographic-research/>

| *Nature* (15 Feb 2006)

A popular perspective

<https://doi.org/10.1038/439800a>

| *The Guardian* (16 Nov 2004)

The altered states

<https://www.theguardian.com/world/2004/nov/16/uselections2004.comment>

| *Washington Post* (13 Nov 2004)

Election map makers, exercising some latitude

<https://www.washingtonpost.com/wp-dyn/articles/A46719-2004Nov12.html>

| *CNN* (12 Nov 2004)

Paula Zahn now

<http://edition.cnn.com/TRANSCRIPTS/0411/12/pzn.01.html>

SELECTED MEDIA COVERAGE (CONTINUED)

About my work on opinion formation

GNT, Brazilian television (17 Mar 2021)

Saia Justa

https://michaelgastner.com/videos/VT_HIPOCRISIA_GNT.mp4

Physics World (12 Dec 2019)

Voter model examines how opinions spread between social networks

<https://physicsworld.com/a/voter-model-examines-how-opinions-spread-between-social-networks/>

Cordis, European Commission (25 Aug 2016)

A game theoretic perspective on network dynamics

https://www.cordis.europa.eu/result/rcn/188386_en.html

About my work on transport networks

Hakai Magazine (23 Sep 2019)

The ballast of colonization

<https://www.hakaimagazine.com/ballast-podcast/>

ARD, German public television (19 Jun 2014)

Wissen vor Acht

<https://web.archive.org/web/20170408183354/http://www.daserste.de/information/wissen-kultur/wissen-vor-acht-natur/sendung/wissen-vor-acht-natur-344.html>

ZDF, German public television (3 Jun 2013)

Deutschland von oben 3: Fluss (beginning at minute 38:00)

<https://www.zdf.de/dokumentation/terra-x/terra-x-deutsche-gewaesser-von-oben-100.html>

Wall Street Journal (7 May 2013)

Roving sea squirts, mussels threaten top Asian ports

<https://www.wsj.com/articles/BL-CJB-17670>

Der Spiegel (6 May 2013)

Eingeschleppte Arten: Forscher kartieren Wege der Bioinvasoren

<https://www.spiegel.de/wissenschaft/natur/ingeschleppte-arten-forscher-kartieren-routen-der-bioninvasoren-a-898178.html#ref=rss>

BBC News (5 May 2013)

Scientists map global routes of ship-borne invasive species

<https://www.bbc.co.uk/news/science-environment-22397076>

Scientific American (1 Feb 2009)

Removing roads and traffic lights speeds urban travel

<https://www.scientificamerican.com/article/removing-roads-and-traffic-lights/>

The Atlantic (1 Dec 2008)

Share the road

<https://www.theatlantic.com/magazine/archive/2008/12/quick-study/307155/>

The Economist (11 Sep 2008)

Queuing conundrums

<https://www.economist.com/science-and-technology/2008/09/11/queuing-conundrums>

RESEARCH SUPERVISION

Yale-NUS College (Capstone theses)

- Fung Lee Tat Kelvin: Effectiveness of Cartogram Legend and Grid Lines (2021)
- Matthias E. Goh: Topology-Aware Construction of Density-equalising Map Projections (2021)
- Ian K. Duncan: An Evaluation of the Usability of the Web-Based Cartogram Generation Tool go-cart.io (2021)
- Kota Ishida: Two-community Voter Model (2020)
- Shi Tingsheng: go-cart.io—Implementing Good Practices for Generating Contiguous Area Cartograms Online (2020)
- Adam Y. M. Tonks: Reducing Regional Distortions in Flow-based Algorithm Cartograms (2018)
- Evan Asava Aree: A Simulation Model and Web App as a Research and Pedagogical Tool to Understand Succession in Secondary Forests (2018)
- Anna Evtushenko: Networks of Interlocking Directorates, a Global Approach (2017)

Imperial College London (Master of Science theses)

- Elias Bamis: Constrained Gravity Models for Network Flows (2012)
- Vivien Seguy: Cartograms (2011)
- Ahmed-Amine Homman: Percolation Thresholds on Correlated Lattices and Finite-Size Scaling (2011)

SERVICE TO THE RESEARCH COMMUNITY

Appointed membership

- International Cartographic Association Commission on Map Projections (since 2019)

Peer reviewing

- Review Editor: *Frontiers in Ecology and Evolution* (2013–2021).
- Book proposal review: CRC Press (Taylor and Francis Group)
- Reviews for journals:
 - Interdisciplinary: *Journal of the Royal Society Interface*, *Nature Communications*, *Scientific Reports*, *Royal Society Open Science*, *PLOS ONE*
 - Physics: *Physical Review Letters*, *Physical Review E*, *New Journal of Physics*, *EPL (Europhysics Letters)*, *Physics Letters A*, *Journal of Statistical Physics*
 - Computer science: *IEEE Transactions on Visualization and Computer Graphics*, *Mathematics and Computers in Simulation*, *Knowledge-Based Systems*, *ACM Transactions on Spatial Algorithms and Systems*, *Digital*
 - Geography: *International Journal of Geographical Information Science*, *Cartographic Journal*, *Applied Geomatics*, *Spatial Statistics*, *Environment and Planning B*, *Geo-spatial Information Science*
 - Biology: *PLOS Computational Biology*, *Global Ecology and Biogeography*, *International Journal of Health Geographics*, *Ecography*, *Ecological Modelling*, *Insectes Sociaux*
 - Miscellaneous: *Journal of Advanced Transportation*, *Mathematical Methods in the Applied Sciences*

Conference organisation

- Programme Committee:
 - Ninth International Conference on Complex Networks and Their Applications (Madrid, 2020),
 - European Conference on Complex Systems (Oxford, 2006)

SERVICE TO THE RESEARCH COMMUNITY (CONTINUED)

- Organising Committee: Frontiers in Network Science (Berlin, 2009)
- Chaired Sessions:
 - Conference on Complex Systems (Singapore, 2019),
 - International Cartographic Conference (Tokyo, 2019)

Outreach

- Research supervision of high school student Ananya Shah (Singapore American School, 2021)
- Presentation at Singapore Ministry of National Development: “A Fast Flow-Based Algorithm for Creating Density-Equalizing Map Projections” (2019)
- Expert consultation for research project of secondary-school students (Raffles Institute, Singapore, 2017)

SERVICE TO YALE-NUS

- Member of search committee for Data Science lecturer positions (2021)
- Host of MCS Major Fair (2021)
- Host of Rector’s Tea Lecture (2019)
- Organiser of Mathematical and Computational Sciences booth at Experience Yale-NUS Academic Fair (since 2017)
- Research supervisor and presenter for the Yale-NUS Summer Research Programme (since 2016)
- Participant in seven cases brought to the Committee on Integrity and Discipline (since 2015)
- Academic advisor of 33 students (since 2015)

APPENDIX: COMPLETE PUBLICATION LIST

Peer-reviewed journal articles

- G. Ódor, **M. T. Gastner**, J. Kelling and G. Deco
Modelling on the very large-scale connectome
J. Phys. Complex. 2(4):045002 (2021)
DOI: [10.1088/2632-072X/ac266c](https://doi.org/10.1088/2632-072X/ac266c)
- K. Ishida, B. Oborny and **M. T. Gastner**
Agent-based neutral competition in two-community networks
Phys. Rev. E 104(2):024308 (2021)
DOI: [10.1103/PhysRevE.104.024308](https://doi.org/10.1103/PhysRevE.104.024308)
- Y. C. Yau and **M. T. Gastner**
Mapping the inequality of the global distribution of seasonal influenza vaccine
Environ. Plan. A 53(6):1249-1252 (2021)
DOI: [10.1177/0308518X21998356](https://doi.org/10.1177/0308518X21998356)
- I. K. Duncan, S. Tingsheng, S. T. Perrault and **M. T. Gastner**
Task-based effectiveness of interactive contiguous area cartograms
IEEE Trans. Vis. Comput. Graph. 27(3):2136–2152 (2021)
DOI: [10.1109/TVCG.2020.3041745](https://doi.org/10.1109/TVCG.2020.3041745)
- M. T. Gastner** and K. Ishida
Voter model on networks partitioned into two cliques of arbitrary sizes
J. Phys. A: Math. Theor. 52(50):505701 (2019)
DOI: [10.1088/1751-8121/ab542f](https://doi.org/10.1088/1751-8121/ab542f)
- M. T. Gastner**, K. Takács, M. Gulyás, Z. Szvetelszky and B. Oborny
The impact of hypocrisy on opinion formation: a dynamic model
PLOS ONE 14(6):e0218729 (2019)
DOI: [10.1371/journal.pone.0218729](https://doi.org/10.1371/journal.pone.0218729)
- M. T. Gastner**, B. Oborny and M. Gulyás
Consensus time in a voter model with concealed and publicly expressed opinions
J. Stat. Mech. Theory Exp. 2018(6):063401 (2018)
DOI: [10.1088/1742-5468/aac14a](https://doi.org/10.1088/1742-5468/aac14a)
- M. T. Gastner**, V. Seguy and P. More
Fast flow-based algorithm for creating density-equalizing map projections
Proc. Natl. Acad. Sci. U.S.A. 115(10):E2156–E2164 (2018)
DOI: [10.1073/pnas.1712674115](https://doi.org/10.1073/pnas.1712674115)
- M. T. Gastner** and G. Ódor
The topology of large Open Connectome networks for the human brain
Sci. Rep. 6(6):27249 (2016)
DOI: [10.1038/srep27249](https://doi.org/10.1038/srep27249)
- M. T. Gastner**
The Ising chain constrained to an even or odd number of positive spins
J. Stat. Mech. Theory Exp. 2015(3):P03004 (2015)
DOI: [10.1088/1742-5468/2015/03/P03004](https://doi.org/10.1088/1742-5468/2015/03/P03004)
- M. T. Gastner**, N. Markou, G. Pruessner and M. Draief
Opinion formation models on a gradient
PLOS ONE 9(12):e114088 (2014)
DOI: [10.1371/journal.pone.0114088](https://doi.org/10.1371/journal.pone.0114088)

APPENDIX: COMPLETE PUBLICATION LIST (CONTINUED)

- V. Salnikov, D. Schien, H. Youn, R. Lambiotte and **M. T. Gastner**
 The geography and carbon footprint of mobile phone use in Côte d'Ivoire
EPJ Data Sci. 3(1):3 (2014)
 DOI: [10.1140/epjds21](https://doi.org/10.1140/epjds21)
- H. Seebens, **M. T. Gastner** and B. Blasius
 The risk of marine bioinvasion caused by global shipping
Ecol. Lett. 16(6):782–790 (2013)
 DOI: [10.1111/ele.12111](https://doi.org/10.1111/ele.12111)
- M. T. Gastner** and B. Oborny
 The geometry of percolation fronts in two-dimensional lattices with spatially varying densities
New J. Phys. 14(10):103019 (2012)
 DOI: [10.1088/1367-2630/14/10/103019](https://doi.org/10.1088/1367-2630/14/10/103019)
- M. T. Gastner**
 Scaling and entropy in p -median facility location along a line
Phys. Rev. E 84(3):036112 (2011)
 DOI: [10.1103/PhysRevE.84.036112](https://doi.org/10.1103/PhysRevE.84.036112)
- M. T. Gastner**, B. Oborny, A. B. Ryabov and B. Blasius
 Changes in the gradient percolation transition caused by an Allee effect
Phys. Rev. Lett. 106(12):128103 (2011)
 DOI: [10.1103/PhysRevLett.106.128103](https://doi.org/10.1103/PhysRevLett.106.128103)
- P. Kaluza, A. Kölzsch, **M. T. Gastner** and B. Blasius
 The complex network of global cargo ship movements
J. Royal Soc. Interface 7(48):1093–1103 (2010)
 DOI: [10.1098/rsif.2009.0495](https://doi.org/10.1098/rsif.2009.0495)
- M. T. Gastner**, B. Oborny, D. K. Zimmermann and G. Pruessner
 Transition from connected to fragmented vegetation across an environmental gradient:
 Scaling laws in ecotone geometry
Am. Nat. 174(1):E23–E39 (2009)
 DOI: [10.1086/599292](https://doi.org/10.1086/599292)
- H. Youn, **M. T. Gastner** and H. Jeong
 Price of anarchy in transportation networks: Efficiency and optimality control
Phys. Rev. Lett. 101(12):128701 (2008)
 DOI: [10.1103/PhysRevLett.101.128701](https://doi.org/10.1103/PhysRevLett.101.128701)
- M. T. Gastner** and M. E. J. Newman
 Optimal design of spatial distribution networks
Phys. Rev. E 74(1):016117 (2006)
 DOI: [10.1103/PhysRevE.74.016117](https://doi.org/10.1103/PhysRevE.74.016117)
- M. T. Gastner** and M. E. J. Newman
 The spatial structure of networks
Eur. Phys. J. B 49(2):247–252 (2006)
 DOI: [10.1140/epjb/e2006-00046-8](https://doi.org/10.1140/epjb/e2006-00046-8)
- M. T. Gastner** and M. E. J. Newman
 Shape and efficiency in spatial distribution networks
J. Stat. Mech. Theory Exp. 2006(1):P01015 (2006)
 DOI: [10.1088/1742-5468/2006/01/P01015](https://doi.org/10.1088/1742-5468/2006/01/P01015)

APPENDIX: COMPLETE PUBLICATION LIST (CONTINUED)

M. T. Gastner, C. R. Shalizi and M. E. J. Newman
 Maps and cartograms of the 2004 US presidential election results
Adv. Complex Syst. 8(1):117–123 (2005)
 DOI: [10.1142/S0219525905000397](https://doi.org/10.1142/S0219525905000397)

M. T. Gastner and M. E. J. Newman
 Diffusion-based method for producing density-equalizing maps
Proc. Natl. Acad. Sci. U.S.A. 101(20):7499–7504 (2004)
 DOI: [10.1073/pnas.0400280101](https://doi.org/10.1073/pnas.0400280101)

Peer-reviewed long conference papers

S. Tingsheng, I. K. Duncan, Y.-N. Chang and **M. T. Gastner**
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APPENDIX: COMPLETE PUBLICATION LIST (CONTINUED)

Encyclopedia entry**M. T. Gastner**

Cartogram

in B. S. Daya Sagar et al. (Eds.), *Encyclopedia of Mathematical Geosciences*
(Springer Nature, Heidelberg, in press)**Peer-reviewed book chapter****M. T. Gastner** and C. Ducruet

The distribution functions of vessel calls and port connectivity in the global cargo ship network

in C. Ducruet (Ed.), *Maritime networks: Spatial structures and time dynamics*, pp. 289-294 (Routledge, London, 2015)DOI: [10.4324/9781315692852](https://doi.org/10.4324/9781315692852)**Peer-reviewed abstracts****M. T. Gastner**, S. T. Perrault and C.-C. Feng

Balancing Shape Distortions and Contiguity in Cartograms

Abstr. Int. Cartogr. Assoc. (in press)**M. T. Gastner** and K. Ishida

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ISBN: [978-2-9557050-3-2](https://www.isbn-international.org/product/978-2-9557050-3-2)S. Tingsheng, I. K. Duncan and **M. T. Gastner**

go-cart.io: a web application for generating contiguous cartograms

Abstr. Int. Cartogr. Assoc. 1:333 (2019)DOI: [10.5194/ica-abs-1-333-2019](https://doi.org/10.5194/ica-abs-1-333-2019)**Technical Report****M. T. Gastner***Network formation, statistical physics and social dynamics*

Technical Report, CORDIS (European Commission), published online on 17 February 2016

https://cordis.europa.eu/docs/results/327/327325/final1-final_report.pdf**Ph.D. thesis****M. T. Gastner***Spatial distributions: Density-equalizing map projections, facility location, and two-dimensional networks*

Ph.D. dissertation, Univ. Michigan (Ann Arbor, 2005)

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