Michael T. Gastner

Contact Information

Address:	Yale-NUS College, 16 College Avenue West, Singapore 138527
Phone:	+65 9384 3964
email:	michael.gastner@yale-nus.edu.sg
www:	http://www.michaelgastner.com

Personal Profile

Assistant Professor at Yale-NUS College in Singapore. Internationally experienced educator at the undergraduate and postgraduate level. Author of highly cited articles on data visualization, cartography, network analysis and mathematical modelling. Originator of the go-cart.io project, which makes cartogram generation easy and user-friendly.

Academic Positions

Current since Jul 2015	Yale-NUS College (Singapore): Assistant Professor *Mathematical, Computational and Statistical Sciences* Yale-NUS is the first liberal arts college in Singapore. I teach and design modules for the "Common Curriculum" and specialized elective courses. I also supervise undergraduate research culminating in "Capstone Projects" in the students' senior year.
Jun 2015 – Nov 2013	Hungarian Academy of Sciences (Budapest): Marie Curie Fellow *Institute of Technical Physics and Materials Science* Independent research in statistical physics, network analysis and game theory
Oct 2013 – Sep 2012	University of Bristol (UK): Lecturer *Department of Engineering Mathematics* Independent research in complex systems, PhD project supervision, lecturer for undergraduate and postgraduate courses
Aug 2012 – Dec 2009	Imperial College (London): Junior Research Fellow *Mathematics Department* Independent research in complexity and network science, lecturer of postgraduate courses
Nov 2009 – May 2008	Carl von Ossietzky Universität, Oldenburg (Germany): Research Fellow *Institute for Chemistry and Biology of the Marine Environment* 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 Research in complex systems and interdisciplinary science

Qualifications

Aug 2005 – Sep 2000	University of Michigan (USA): PhD *Physics Department* | 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 *Physics Department* Average mark: 1.0 (best possible mark on a scale from 1.0 to 6.0)

Selected Publications

See page 9 for complete publication list

Interactive Cartograms

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

Cartograms are map-based data visualizations 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 have been criticized as difficult to read. We conducted an experiment to evaluate whether cartograms are more legible if they are accompanied by interactive features (animations, linked brushing, or infotips). Elementary tasks were carried out equally well with and without interactivity. Synoptic tasks were more difficult without interactive features. With access to interactivity, however, most participants answered even synoptic questions correctly. Among the interactive features, animations had the strongest positive effect, so we recommend them as a minimum of interactivity when cartograms are displayed on a computer screen.

Fast Cartogram algorithm

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

Geographic maps are a popular means to visualize spatial statistics. Conventionally, each map region is displayed with an area proportional to the actual land area. However, equal-area maps can grossly misrepresent demographic data: densely populated cities should be given more prominence than large, but sparsely populated territories. Cartograms solve this problem by rescaling map regions in proportion to, for example, population or gross domestic products. Here we describe and benchmark a fast flow-based algorithm that computes cartograms in a matter of seconds.

Network analysis

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

The global network of merchant ships plays a crucial role in human mobility, the exchange of goods and the spread of invasive species. We use information about the itineraries of 16 363 cargo ships during the year 2007 to construct a network of links between ports. We show that bulk dry carriers, container ships and oil tankers differ in their mobility patterns and networks. Container ships follow regularly repeating paths whereas bulk dry carriers and oil tankers move less predictably between ports. The network of all ship movements possesses a heavy-tailed distribution with systematic differences between ship types.

Diffusion cartogram algorithm

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

Cartograms are maps in which the sizes of geographic regions (e.g. countries, provinces) appear in proportion to quantitative data (e.g., population or gross domestic products). Such maps are invaluable for data visualization. Unfortunately, to scale regions and still have them fit together, one is normally forced to distort the regions' shapes, potentially resulting in maps that are difficult to read. Here we present a technique based on ideas borrowed from elementary physics that suffers from none of these drawbacks.

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. 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. 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 teaches quantitative literacy so that students grasp how algorithmic and statistical thinking is used in the natural and social sciences.

Monte Carlo Simulations in Science and Statistics
Yale-NUS College (2017)

Monte Carlo simulations are computer experiments that solve numerical problems by using random number generators. At first glance, it may seem bizarre to use a computer, arguably the most accurate and deterministic of all human inventions, to perform random experiments. However, Monte Carlo simulations are nowadays an essential component in many quantitative studies. They are used in the natural sciences, industrial engineering, finance and statistics. 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)

What do stock markets, the weather, genetic mutations and the movements of a drunkard have in common? All these phenomena are subject to a certain degree of randomness. Such "stochastic processes" are a vibrant area of interdisciplinary research, ranging from mathematical finance over biology to predicting waiting times in supermarket queues. 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)

Game theory is the branch of mathematics that describes how self-interested players choose between several options when the outcome depends not only on their own decision, but also on the choices made by others. "Games" in this mathematical sense may indeed be games in the usual sense of the word (e.g. poker or sports). However, game theory also applies to situations that we would not usually call games, such as auctions or armed conflicts. In evolutionary biology, game theory can even explain phenomena where nobody is overtly making any decisions. 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.

Teaching experience (ctd.)

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, Honors, Grants and Fellowships

Yale-NUS Special Pockets Research Grant (2021)
"Topological colouring algorithm for cartograms" (S$ 1500)

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)

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

FP7 Marie Curie Fellowship (2013–2015)
Competitive intra-European fellowship (total support: € 184,000)

Awards, Honors, Grants and Fellowships (ctd.)

Building Global Engagements in Research (2012–2013)
Competitively awarded internal responsive mode funding at the University of Bristol (£ 3440 travel award)

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)

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)

Rackham Dissertation Grant (2005)
Awarded by the University of Michigan for exceptionally promising PhD dissertation projects (tuition fees + monthly stipend)

Wirt and Mary Cornwell Prize (2004)
Awarded to PhD students who have "demonstrated greatest intellectual curiosity, given most promise of original study and creative work" ($ 10,000 cash award)

Max Kade Foundation Scholarship (2000–2001)
Competitive fellowship to promote German-US educational exchange (tuition fees + monthly stipend)

Invited positions

Dec 2018 – Oct 2018	Hungarian Academy of Sciences (Budapest): Visiting Senior Research Fellow *Centre for Social Sciences, RECENS research group*
May 2008 – Jan 2008	University of New Mexico (USA): Visiting Postdoctoral Researcher *Department of Computer Science*

Memberships

- International Cartographic Association Commission on Map Projections
- Complex Systems Society
- Society for Industrial and Applied Mathematics
- Deutsche Physikalische Gesellschaft

Mentoring of student theses

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)

Mentoring of Student Theses (ctd.)

- 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)

Imperial College London (Master of Science theses)

- 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)
- 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)

Invited Presentations in the last 5 years

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, Institut für Geographie, Universität Augsburg
Oct 2020	*Conveying geospatial information with contiguous area cartograms* Seminar, Biology Department, Hong Kong Baptist University
Mar 2020	*Cartograms: geographic maps reimagined* 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
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 (Universiti Kebangsaan Malaysia), Bangi
Dec 2018	*A fast flow-based algorithm for creating density-equalizing map projections* 3rd Asia-Pacific Conference on Complex Systems Design and Management, Singapore

Invited Presentations in the last 5 years (ctd.)

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 & Networks Group, Imperial College London
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

Selected Media Coverage

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

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/

Hakai Magazine (23 Sep 2019)
The ballast of colonization
https://www.hakaimagazine.com/ballast-podcast/

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/

Selected Media Coverage (ctd.)

Cordis, European Commission (25 Aug 2016)
A game theoretic perspective on network dynamics
https://www.cordis.europa.eu/result/rcn/188386_en.html

ARD, German public television (19 Jun 2014)
Wissen vor Acht
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)
http://www.zdf.de/Terra-X/Deutsche-Gew%C3%A4sser-von-oben-28028250.html

Wall Street Journal (7 May 2013)
Roving sea squirts, mussels threaten top Asian ports
http://blogs.wsj.com/chinarealtime/2013/05/07/roving-sea-squirts-mussels-threaten-top-asian-ports/

Der Spiegel (6 May 2013)
Eingeschleppte Arten: Forscher kartieren Wege der Bioinvasoren
http://www.spiegel.de/wissenschaft/natur/eingeschleppte-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
http://www.bbc.co.uk/news/science-environment-22397076

The Atlantic (1 Dec 2008)
Share the road
http://www.theatlantic.com/magazine/archive/2008/12/quick-study/307155/

The Economist (11 Sep 2008)
Queuing conundrums
http://www.economist.com/node/12202559

The Guardian (16 Nov 2004)
The altered states
http://www.theguardian.com/world/2004/nov/16/uselections2004.comment

Washington Post (13 Nov 2004)
Election map makers, exercising some latitude
http://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

Further media coverage in Science, Nature, Scientific American, Los Angeles Times, Die Welt, Stern and many others.

Appendix: Complete Publication List

M. T. Gastner
Cartogram
in B. S. Daya Sagar et al. (Eds.), *Encyclopedia of Mathematical Geosciences*
(Springer Nature, Heidelberg, in press)

G. Ódor, **M. T. Gastner**, J. Kelling and G. Deco
Modelling the very large-scale connectome
arXiv Preprint (2021)
arXiv:2104.11666

Y. C. Yau and **M. T. Gastner**
Mapping the inequality of the global distribution of seasonal influenza vaccine
Env. Plan. A (in press)
DOI: 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

S. Tingsheng, I. K. Duncan, Y.-N. Chang and **M. T. Gastner**
Motivating good practices for the creation of contiguous area cartograms
in T. Bandrova et al. (Eds.), *8th Int. Conf. Cartogr. GIS*, vol. 1, pp. 589–598
(Bulgarian Cartographic Association, Sofia, 2020)
ISSN: 1314-0604

A. Evtushenko and **M. T. Gastner**
Beyond Fortune 500: Women in a global network of directors
in H. Cherifi et al. (Eds.), *Complex Networks and Their Applications VIII*
Proc. 8th Int. Conf. Complex Networks and Their Applications, vol. 1, pp. 586–598
(Springer, Cham, 2020)
DOI: 10.1007/978-3-030-36683-4_47

M. T. Gastner and K. Ishida
Mean consensus time of the voter model on networks partitioned into two cliques of arbitrary sizes
in H. Cherifi et al. (Eds.), *Complex Networks 2019*, pp. 46–48
(Int. Conf. Complex Networks and Their Applications, Lisbon, 2019)
ISBN: 978-2-9557050-3-2

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

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

Appendix: Complete Publication List (ctd.)

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

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

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

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

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

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

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

M. T. Gastner and C. Ducruet
How heavy-tailed is the distribution of global cargo ship traffic?
10th Int. Conf. Signal-Image Technology & Internet-Based Systems, pp. 289–294 (2014)
DOI: 10.1109/SITIS.2014.33

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

V. Salnikov, D. Schien, H. Youn, R. Lambiotte and **M. T. Gastner**
The geography and carbon footprint of mobile phone use in Cote d'Ivoire
EPJ Data Sci. 3(1):3 (2014)
DOI: 10.1140/epjds21

Appendix: Complete Publication List (ctd.)

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

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

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

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

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

M. T. Gastner
Traffic flow in a spatial network model
in A. Minai, D. Braha and Y. Bar-Yam (Eds.), *Unifying Themes in Complex Systems*, pp. 315-322 (Springer, Berlin, 2010)
DOI: 10.1007/978-3-540-85081-6_40

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

H. Youn, **M. T. Gastner** and H. Jeong
Inefficiency in networks with multiple sources and sinks
in J. Zhou (Ed.), *Complex Sciences*, pp. 334–338 (Springer, Berlin, 2009)
DOI: 10.1007/978-3-642-02466-5_32

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

M. T. Gastner
Shape and efficiency in growing spatial distribution networks
2nd Eur. Conf. Complex Systems, pp. 82 (2006)
http://www.cabdyn.ox.ac.uk/complexity_PDFs/ECCS06/Conference_Proceedings/PDF/p82.pdf

Appendix: Complete Publication List (ctd.)

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

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

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

M. T. Gastner
Spatial distributions: Density-equalizing map projections, facility location, and two-dimensional networks
Ph.D. dissertation, Univ. Michigan (Ann Arbor, 2005)
https://deepblue.lib.umich.edu/handle/2027.42/125368

M. T. Gastner and M. E. J. Newman
Density-equalizing map projections: Diffusion-based algorithm and applications
8th Int. Conf. GeoComputation (2005)
http://www.geocomputation.org/2005/

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

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