

References

- Achard, S., Bullmore, E., 2007. Efficiency and cost of economical brain functional networks. *PLoS Comput. Biol.* 3, e17.
- Achard, S., Salvador, R., Whitcher, B., Suckling, J., Bullmore, E., 2006. A resilient, low-frequency, small-world human brain functional network with highly connected association cortical hubs. *J. Neurosci.* 26, 63–72.
- Aertsen, A., Erb, M., Palm, G., 1994. Dynamics of functional coupling in the cerebral cortex: an attempt at a model-based interpretation. *Physica D* 75, 103–128.
- Aertsen, A.M., Gerstein, G.L., Habib, M.K., Palm, G., 1989. Dynamics of neuronal firing correlation: modulation of "effective connectivity". *J. Neurophysiol.* 61, 900–917.
- Agar, A., Alderson, R.H., Chescoe, D., 1974. *Principles and Practice of Electron Microscope Operation*. Elsevier, New York, NY.
- Ahlfors, S.P., Han, J., Belliveau, J.W., Hämäläinen, M.S., 2010. Sensitivity of MEG and EEG to source orientation. *Brain Topogr.* 23, 227–232.
- Ahn, Y.-Y., Bagrow, J.P., Lehmann, S., 2010. Link communities reveal multiscale complexity in networks. *Nature* 466, 761–764.
- Ahn, Y.-Y., Jeong, H., Kim, B.J., 2006. Wiring cost in the organization of a biological neuronal network. *Physica A* 367, 531–537.
- Aho, A.V., Hopcraft, J.E., Ullman, J.D., 1983. *Data Structures and Algorithms*. Addison-Wesley, Boston, MA.
- Ahrens, M.B., Li, J.M., Orger, M.B., Robson, D.N., Schier, A.F., Engert, F., Portugues, R., 2012. Brain-wide neuronal dynamics during motor adaptation in zebrafish. *Nature* 485, 471–477.
- Ahrens, M.B., Orger, M.B., Robson, D.N., Li, J.M., Keller, P.J., 2013. Whole-brain functional imaging at cellular resolution using light-sheet microscopy. *Nat. Methods* 10, 413–420.
- Albert, R., Jeong, H., Barabási, A.-L., 2000. Error and attack tolerance of complex networks. *Nature* 406, 378–382.
- Albert, R., Barabási, A.-L., 2002. Statistical mechanics of complex networks. *Rev. Mod. Phys.* 74 (1), 47.
- Albert, R., DasGupta, B., Hegde, R., Sivanathan, G.S., Gitter, A., Gürsoy, G., Paul, P., Sontag, E., 2011. Computationally efficient measure of topological redundancy of biological and social networks. *Phys. Rev. E* 84, 036117.
- Aldecoa, R., Marín, I., 2011. Deciphering network community structure by surprise. *PLoS One* 6, e24195.
- Aldecoa, R., Marín, I., 2013. Surprise maximization reveals the community structure of complex networks. *Sci. Rep.* 3, 1–9.

- Alexander-Bloch, A.F., Reiss, P.T., Rapoport, J., McAdams, H., Giedd, J.N., Bullmore, E.T., Gogtay, N., 2014. Abnormal cortical growth in schizophrenia targets normative modules of synchronized development. *Biol. Psychiatry* 76 (6), 438–446.
- Alexander-Bloch, A.F., Giedd, J.N., Bullmore, E., 2013a. Imaging structural co-variance between human brain regions. *Nat. Rev. Neurosci.* 14, 322–336.
- Alexander-Bloch, A.F., Gogtay, N., Meunier, D., Birn, R., Clasen, L., Lalonde, F., Lenroot, R., Giedd, J., Bullmore, E.T., 2010. Disrupted modularity and local connectivity of brain functional networks in childhood-onset schizophrenia. *Front. Syst. Neurosci.* 4, 147.
- Alexander-Bloch, A.F., Lambiotte, R., Roberts, B., Giedd, J., Gogtay, N., Bullmore, E., 2012. The discovery of population differences in network community structure: new methods and applications to brain functional networks in schizophrenia. *NeuroImage* 59, 3889–3900.
- Alexander-Bloch, A.F., Raznahan, A., Bullmore, E., Giedd, J., 2013b. The convergence of maturational change and structural covariance in human cortical networks. *J. Neurosci.* 33, 2889–2899.
- Alexander-Bloch, A.F., Vértes, P.E., Stidd, R., Lalonde, F., Clasen, L., Rapoport, J., Giedd, J., Bullmore, E.T., Gogtay, N., 2013c. The anatomical distance of functional connections predicts brain network topology in health and schizophrenia. *Cereb. Cortex* 23, 127–138.
- Alexander, D.C., 2005. Multiple-fiber reconstruction algorithms for diffusion MRI. *Ann. N. Y. Acad. Sci.* 1064, 113–133.
- Alexander, D.C., Hubbard, P.L., Hall, M.G., Moore, E.A., Ptito, M., Parker, G.J., Dyrby, T.B., 2011. Orientationally invariant indices of axon diameter and density from diffusion MRI. *NeuroImage* 52, 1374–1389.
- Alivisatos, A.P., Chun, M., Church, G.M., Greenspan, R.J., Roukes, M.L., Yuste, R., 2012. The brain activity map project and the challenge of functional connectomics. *Neuron* 74, 970–974.
- Alon, U., 2007. Network motifs: theory and experimental approaches. *Nat. Rev. Genet.* 8, 450–461.
- Alstott, J., Breakspear, M., Hagmann, P., Cammoun, L., Sporns, O., 2009. Modeling the impact of lesions in the human brain. *PLoS Comput. Biol.* 5, e1000408.
- Alstott, J., Bullmore, E., Plenz, D., 2014a. Powerlaw: a Python package for analysis of heavy-tailed distributions. *PLoS One* 9, e85777.
- Alstott, J., Panzarasa, P., Rubinov, M., Bullmore, E.T., Vértes, P.E., 2014b. A unifying framework for measuring weighted rich clubs. *Sci. Rep.* 4, 7258.
- Alvarez-Hamelin, J.I., Dall'Asta, L., Barrat, A., Vespignani, A., 2008. k-core decomposition of complex graphs: hierarchies, self-similarity and measurement biases. *Netw. Heterog. Media* 3, 371–399.
- Amaral, L.A., Scala, A., Barthelemy, M., Stanley, H.E., 2000. Classes of small-world networks. *Proc. Natl. Acad. Sci. U. S. A.* 97, 11149–11152.
- Amunts, K., Malikovic, A., Mohlberg, H., Schormann, T., Zilles, K., 2000. Brodmann's areas 17 and 18 brought into stereotaxic space—where and how variable? *NeuroImage* 11, 66–84.
- Andreotti, J., Jann, K., Melie-Garcia, L., Giezendanner, S., Abela, E., Wiest, R., Dierks, T., Federspiel, A., 2014. Validation of network communicability metrics for the analysis of brain structural networks. *PLoS One* 9 (12), e115503.
- Anthonisse, J.M., 1971. The rush in a directed graph. Technical Report BN 9/71. Stichting Mathematisch Centrum, Amsterdam.
- Antonopoulos, C.G., Srivastava, S., Pinto, S.E., Baptista, M.S., 2015. Do brain networks evolve by maximizing their information flow capacity? *PLoS Comput. Biol.* 11 (8), e1004372.
- Anwander, A., Tittgemeyer, M., von Cramon, D.Y., Friederici, A.D., Knosche, T.R., 2007. Connectivity-based parcellation of Broca's area. *Cereb. Cortex* 17, 816–825.
- Arenas, A., Díaz-Guilera, A., Pérez-Vicente, C.J., 2006. Synchronization reveals topological scales in complex networks. *Phys. Rev. Lett.* 96, 114102–114104.

- Aru, J., Aru, J., Priesemann, V., Wibral, M., Lana, L., Pipa, G., Singer, W., Vicente, R., 2015. Untangling cross-frequency coupling in neuroscience. *Curr. Opin. Neurobiol.* 31, 51–61.
- Assaf, Y., Blumenfeld-Katzir, T., Yovel, Y., Basser, P.J., 2008. AxCaliber: a method for measuring axon diameter distribution from diffusion MRI. *Magn. Reson. Med.* 59, 1347–1354.
- Attwell, D., Laughlin, S.B., 2001. An energy budget for signaling in the grey matter of the brain. *J. Cereb. Blood Flow Metab.* 21, 1133–1145.
- Avena-Koenigsberger, A., Goñi, J., Betzel, R.F., van den Heuvel, M.P., Griffa, A., Hagmann, P., Thiran, J.-P., Sporns, O., 2014. Using Pareto optimality to explore the topology and dynamics of the human connectome. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 369, 20130530.
- Avena-Koenigsberger, A., Goñi, J., Sole, R., Sporns, O., 2015. Network morphospace. *J. R. Soc. Interface* 12, 20140881.
- Averbach, B.B., Latham, P.E., Pouget, A., 2006. Neural correlations, population coding and computation. *Nat. Rev. Neurosci.* 7, 358–366.
- Axer, M., Amunts, K., Grassel, D., Palm, C., Dammers, J., Axer, H., Pietrzyk, U., Zilles, K., 2011. A novel approach to the human connectome: ultra-high resolution mapping of fiber tracts in the brain. *NeuroImage* 54, 1091–1101.
- Azouz, R., 2005. Dynamic spatiotemporal synaptic integration in cortical neurons: neuronal gain, revisited. *J. Neurophysiol.* 94, 2785–2796.
- Baars, B.J., 1989. *A Cognitive Theory of Consciousness*. Cambridge University Press, Cambridge, MA.
- Baddeley, A., 1996. The fractionation of working memory. *Proc. Natl. Acad. Sci. U. S. A.* 93, 13468–13472.
- Bak, P., 1996. *How Nature Works: The Science of Self-Organized Criticality*. Springer, New York, NY.
- Bak, P., Tang, C., Wiesenfeld, K., 1987. Self-organized criticality: an explanation of the 1/f noise. *Phys. Rev. Lett.* 59 (4), 381.
- Baker, S.T.E., Lubman, D.I., Yücel, M., Allen, N.B., Whittle, S., Fulcher, B.D., Zalesky, A., Fornito, A., 2015. Developmental changes in brain network hub connectivity in late adolescence. *J. Neurosci.* 35, 9078–9087.
- Bakker, R., Wachtler, T., Diesmann, M., 2012. CoCoMac 2.0 and the future of tract-tracing databases. *Front. Neuroinform.* 6, 30.
- Ball, G., Srinivasan, L., Aljabar, P., Counsell, S.J., Durighel, G., Hajnal, J.V., Rutherford, M.A., Edwards, A.D., 2013. Development of cortical microstructure in the preterm human brain. *Proc. Natl. Acad. Sci. U. S. A.* 110, 9541–9546.
- Banerjee, A., Jost, J., 2009. Graph spectra as a systematic tool in computational biology. *Discrete Appl. Math.* 157, 2425–2431.
- Banerjee, A., Jost, J., 2008. On the spectrum of the normalized graph Laplacian. *Linear Algebra Appl.* 428, 3015–3022.
- Barabási, A.-L., 2002. *Linked*. Basic Books, Philadelphia, PA.
- Barabási, A.L., Albert, R., 1999. Emergence of scaling in random networks. *Science* 286 (5439), 509–512.
- Barahona, M., Pecora, L.M., 2002. Synchronization in small-world systems. *Phys. Rev. Lett.* 89, 054101.
- Bargmann, C.I., Marder, E., 2013. From the connectome to brain function. *Nat. Methods* 10, 483–490.
- Barnes, A., Bullmore, E.T., Suckling, J., 2009. Endogenous human brain dynamics recover slowly following cognitive effort. *PLoS One* 4, e6626.
- Barnett, L., Buckley, C.L., Bullock, S., 2009. Neural complexity and structural connectivity. *Phys. Rev. E* 79, 051914.

- Barnett, L., Buckley, C.L., Bullock, S., 2011. Neural complexity: a graph theoretic interpretation. *Phys. Rev. E* 83, 041906.
- Barrat, A., Barthelemy, M., Pastor-Satorras, R., Vespignani, A., 2004. The architecture of complex weighted networks. *Proc. Natl. Acad. Sci. U. S. A.* 101, 3747–3752.
- Bartels, A., Logothetis, N.K., Moutoussis, K., 2008. fMRI and its interpretations: an illustration on directional selectivity in area V5/MT. *Trends Neurosci.* 31, 444–453.
- Barthélemy, M., 2011. Spatial networks. *Phys. Rep.* 499 (1), 1–101.
- Bassett, D.S., Nelson, B.G., Mueller, B.A., Camchong, J., Lim, K.O., 2012. Altered resting state complexity in schizophrenia. *NeuroImage* 59 (3), 2196–2207.
- Bassett, D.S., Gazzaniga, M.S., 2011. Understanding complexity in the human brain. *Trends Cogn. Sci.* 15 (5), 200–209.
- Bassett, D.S., Bullmore, E., 2006. Small-world brain networks. *Neuroscientist* 12 (6), 512–523.
- Bassett, D.S., Bullmore, E., Verchinski, B.A., Mattay, V.S., Weinberger, D.R., Meyer-Lindenberg, A., 2008. Hierarchical organization of human cortical networks in health and schizophrenia. *J. Neurosci.* 28, 9239–9248.
- Bassett, D.S., Bullmore, E.T., Meyer-Lindenberg, A., Apud, J.A., Weinberger, D.R., Coppola, R., 2009. Cognitive fitness of cost-efficient brain functional networks. *Proc. Natl. Acad. Sci. U. S. A.* 106 (28), 11747–11752.
- Bassett, D.S., Greenfield, D.L., Meyer-Lindenberg, A., Weinberger, D.R., Moore, S.M., Bullmore, E.T., 2010. Efficient physical embedding of topologically complex information processing networks in brains and computer circuits. *PLoS Comput. Biol.* 6, e1000748.
- Bassett, D.S., Meyer-Lindenberg, A., Achard, S., Duke, T., Bullmore, E., 2006. Adaptive reconfiguration of fractal small-world human brain functional networks. *Proc. Natl. Acad. Sci. U. S. A.* 103, 19518–19523.
- Bassett, D.S., Porter, M.A., Wymbs, N.F., Grafton, S.T., Carlson, J.M., Mucha, P.J., 2013a. Robust detection of dynamic community structure in networks. *Chaos* 23, 013142. 16.
- Bassett, D.S., Wymbs, N.F., Porter, M.A., Mucha, P.J., Carlson, J.M., Grafton, S.T., 2011. Dynamic reconfiguration of human brain networks during learning. *Proc. Natl. Acad. Sci. U. S. A.* 108, 7641–7646.
- Bassett, D.S., Wymbs, N.F., Rombach, M.P., Porter, M.A., Mucha, P.J., Grafton, S.T., 2013b. Task-based core-periphery organization of human brain dynamics. *PLoS Comput. Biol.* 9, e1003071.
- Bassett, D.S., Yang, M., Wymbs, N.F., Grafton, S.T., 2015. Learning-induced autonomy of sensorimotor systems. *Nat. Neurosci.* 18, 744–751.
- Bastos, A.M., Vezoli, J., Fries, P., 2015a. Communication through coherence with inter-areal delays. *Curr. Opin. Neurobiol.* 31, 173–180.
- Bastos, A.M., Vezoli, J., Bosman, C.A., Schoffelen, J.-M., Oostenveld, R., Dowdall, J.R., De Weerd, H., Kennedy, H., Fries, P., 2015b. Visual areas exert feedforward and feedback influences through distinct frequency channels. *Neuron* 85, 390–401.
- Batagelj, V., Zaveršnik, M., 2002. Generalized cores. arXiv cs/0202039v1.
- Bauer, F., Jost, J., 2012. Bipartite and neighborhood graphs and the spectrum of the normalized graph Laplacian. *Commun. Anal. Geom.* 21, 787–845.
- Bavelas, A., 1948. A mathematical model for group structures. *Hum. Organ.* 7, 16–30.
- Bavelas, A., 1950. Communication patterns in task-oriented groups. *J. Acoust. Soc. Am.* 22, 271–282.
- Bazzi, M., Porter, M.A., Williams, S., McDonald, M., 2014. Community detection in temporal multi-layer networks, and its application to correlation networks. arXiv 1501.00040v2.
- Beauchamp, M.A., 1965. An improved index of centrality. *Behav. Sci.* 10, 161–163.

- Beckmann, C.F., DeLuca, M., Devlin, J.T., Smith, S.M., 2005. Investigations into resting-state connectivity using independent component analysis. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 360, 1001–1013.
- Beggs, J.M., 2008. The criticality hypothesis: how local cortical networks might optimize information processing. *Phil. Trans. R. Soc. A* 366, 329–343.
- Beggs, J.M., Plenz, D., 2003. Neuronal avalanches in neocortical circuits. *J. Neurosci.* 23 (35), 11167–11177.
- Behrens, T.E., Woolrich, M.W., Jenkinson, M., Johansen-Berg, H., Nunes, R.G., Clare, S., Matthews, P.M., Brady, J.M., Smith, S.M., 2003. Characterization and propagation of uncertainty in diffusion-weighted MR imaging. *Magn. Reson. Med.* 50, 1077–1088.
- Behrens, T.E.J., Berg, H.J., Jbabdi, S., Rushworth, M.F.S., Woolrich, M.W., 2007. Probabilistic diffusion tractography with multiple fibre orientations: what can we gain? *NeuroImage* 34, 144–155.
- Behzadi, Y., Restom, K., Liau, J., Liu, T.T., 2007. A component based noise correction method (CompCor) for BOLD and perfusion based fMRI. *NeuroImage* 37, 90–101.
- Bellman, R., 1958. On a routing problem. *Q. Appl. Math.* 16, 87–90.
- Bendat, J.S., Piersol, A.G., 1986. *Random Data: Analysis and Measurement Procedures*. John Wiley & Sons, New York, NY.
- Bender, E.A., Canfield, E.R., 1978. The asymptotic number of labeled graphs with given degree sequences. *J. Comb. Theory* 24, 296–307.
- Benjamini, Y., Hochberg, Y., 1995. Controlling the false discovery rate: a practical and powerful approach to multiple testing. *J. R. Stat. Soc. Ser. B* 57 (1), 289–300.
- Betzel, R.F., Griffa, A., Avena-Koenigsberger, A., Goñi, J., Thiran, J.-P., Hagmann, P., Sporns, O., 2014. Multi-scale community organization of the human structural connectome and its relationship with resting-state functional connectivity. *Netw. Sci.* 1, 353–373.
- Betzel, R.F., Avena-Koenigsberger, A., Goñi, J., He, Y., de Reus, M.A., Griffa, A., Vértes, P.E., Mišić, B., Thiran, J.P., Hagmann, P., van den Heuvel, M., 2016. Generative models of the human connectome. *Neuroimage* 124, 1054–1064.
- Betzig, E., Patterson, G.H., Sougrat, R., Lindwasser, O.W., 2006. Imaging intracellular fluorescent proteins at nanometer resolution. *Science* 313, 1642–1645.
- Bialonski, S., Lehnertz, K., 2013. Assortative mixing in functional brain networks during epileptic seizures. *Chaos* 23, 033139. 10.
- Birn, R.M., Diamond, J.B., Smith, M.A., Bandettini, P.A., 2006. Separating respiratory-variation-related fluctuations from neuronal-activity-related fluctuations in fMRI. *NeuroImage* 31, 1536–1548.
- Biswal, B., Yetkin, F.Z., Haughton, V.M., Hyde, J.S., 1995. Functional connectivity in the motor cortex of resting human brain using echo-planar MRI. *Magn. Reson. Med.* 34, 537–541.
- Blondel, V.D., Guillaume, J.L., Lambiotte, R., 2008. Fast unfolding of communities in large networks. *J. Stat. Mech. Theory Exp.* E10, P10008.
- Blumenfeld, R.S., Bliss, D.P., Pérez, F., D'Esposito, M., 2014. CoCoTools: open-source software for building connectomes using the CoCoMac anatomical database. *J. Cogn. Neurosci.* 26, 722–745.
- Boccaletti, S., Ivanchenko, M., Latora, V., Pluchino, A., Rapisarda, A., 2007. Detecting complex network modularity by dynamical clustering. *Phys. Rev. E* 75, 045102–045104.
- Boccaletti, S., Latora, V., Moreno, Y., Chavez, M., Hwang, D.U., 2006. Complex networks: structure and dynamics. *Phys. Rep.* 424, 175–308.
- Bock, D.D., Lee, W.-C.A., Kerlin, A.M., Andermann, M.L., Hood, G., Wetzel, A.W., Yurgenson, S., Soucy, E.R., Kim, H.S., Reid, R.C., 2011. Network anatomy and in vivo physiology of visual cortical neurons. *Nature* 471, 177–182.
- Boguñá, M., Krioukov, D., 2012. Navigating ultrasmall worlds in ultrashort time. *Phys. Rev. Lett.* 102, 058701.

- Boguñá, M., Krioukov, D., Claffy, K.C., 2009. Navigability of complex networks. *Nat. Phys.* 5, 74–80.
- Bohland, J.W., Wu, C., Barbas, H., Bokil, H., Bota, M., Breiter, H.C., Cline, H.T., Doyle, J.C., Freed, P.J., Greenspan, R.J., Haber, S.N., Hawrylycz, M., Herrera, D.G., Hilgetag, C.C., Huang, Z.J., Jones, A., Jones, E.G., Karten, H.J., Kleinfeld, D., Kotter, R., Lester, H.A., Lin, J.M., Mensh, B.D., Mikula, S., Panksepp, J., Price, J.L., Safdieh, J., Saper, C.B., Schiff, N.D., Schmahmann, J.D., Stillman, B.W., Svoboda, K., Swanson, L.W., Toga, A.W., Van Essen, D.C., Watson, J.D., Mitra, P.P., 2009. A proposal for a coordinated effort for the determination of brainwide neuroanatomical connectivity in model organisms at a mesoscopic scale. *PLoS Comput. Biol.* 5 (3), e1000334.
- Bohland, J.W., Bokil, H., Pathak, S.D., Lee, C.-K., Ng, L., Lau, C., Kuan, C., Hawrylycz, M., Mitra, P.P., 2010. Clustering of spatial gene expression patterns in the mouse brain and comparison with classical neuroanatomy. *Methods* 50, 105–112.
- Bollobás, B., 1998. Random Graphs. Springer, New York, NY, pp. 215–252.
- Bonacich, P., 1987. Power and centrality: a family of measures. *Am. J. Sociol.* 92, 1170–1182.
- Bonacich, P., Lloyd, P., 2001. Eigenvector-like measures of centrality for asymmetric relations. *Soc. Networks* 23, 191–201.
- Borgatti, S.P., 2005. Centrality and network flow. *Soc. Networks* 27, 55–71.
- Borgatti, S.P., Everett, M.G., 2000. Models of core/periphery structures. *Soc. Networks* 23, 375–395.
- Borgatti, S.P., Everett, M.G., 2006. A graph-theoretic perspective on centrality. *Soc. Networks* 28, 466–484.
- Bota, M., Arbib, M.A., 2004. Integrating databases and expert systems for the analysis of brain structures: connections, similarities, and homologies. *Neuroinformatics* 2, 19–58.
- Bota, M., Dong, H.-W., Swanson, L.W., 2003. From gene networks to brain networks. *Nat. Neurosci.* 6, 795–799.
- Bota, M., Dong, H.-W., Swanson, L.W., 2005. Brain architecture management system. *Neuroinformatics* 3, 15–48.
- Bota, M., Dong, H.W., Swanson, L.W., 2012. Combining collation and annotation efforts toward completion of the rat and mouse connectomes in BAMS. *Front. Neuroinform.* 6, 2.
- Bota, M., Sporns, O., Swanson, L.W., 2015. Architecture of the cerebral cortical association commissum underlying cognition. *Proc. Natl. Acad. Sci. U. S. A.* 112, E2093–E2101.
- Böttger, J., Schurade, R., Jakobsen, E., 2014. Connexel visualization: a software implementation of glyphs and edge-bundling for dense connectivity data using brainGL. *Front. Neurosci.* 8, 115.
- Branco, T., Häusser, M., 2010. The single dendritic branch as a fundamental functional unit in the nervous system. *Curr. Opin. Neurobiol.* 20, 494–502.
- Brandes, U., Delling, D., Gaertler, M., Görke, R., 2006. Maximizing modularity is hard. *arXiv* 0608255v2.
- Breakspear, M., Brammer, M.J., Bullmore, E.T., Das, P., Williams, L.M., 2004. Spatiotemporal wavelet resampling for functional neuroimaging data. *Hum. Brain Mapp.* 23 (1), 1–25.
- Brenner, N., Bialek, W., de Ruyter van Steveninck, R., 2000. Adaptive rescaling maximizes information transmission. *Neuron* 26, 695–702.
- Brier, M.R., Mitra, A., McCarthy, J.E., Ances, B.M., Snyder, A.Z., 2015. Partial covariance based functional connectivity computation using Ledoit-Wolf covariance regularization. *Neuroimage* 121, 29–38.
- Briggman, K.L., Bock, D.D., 2012. Volume electron microscopy for neuronal circuit reconstruction. *Curr. Opin. Neurobiol.* 22, 154–161.

- Briggman, K.L., Denk, W., 2006. Towards neural circuit reconstruction with volume electron microscopy techniques. *Curr. Opin. Neurobiol.* 16, 562–570.
- Brin, S., Page, L., 1998. The anatomy of a large-scale hypertextual web search engine. *Comput. Netw. ISDN Syst.* 30, 107–117.
- Broca, P., 1861. Perte de la parole: ramollissement chronique et destruction partielle du lobe antérieur gauche du cerveau. *Bull. Soc. Anthropol.* 2, 235–238.
- Brouwer, A.E., Haemers, W.H., 2012. *Spectra of Graphs*. Springer, New York, NY.
- Brovelli, A., Ding, M., Ledberg, A., Chen, Y., Nakamura, R., Bressler, S.L., 2004. Beta oscillations in a large-scale sensorimotor cortical network: directional influences revealed by Granger causality. *Proc. Natl. Acad. Sci. U. S. A.* 101, 9849–9854.
- Brummitt, C.D., D’Souza, R.M., 2012. Suppressing cascades of load in interdependent networks. *Proc. Natl. Acad. Sci. U. S. A.* 109, E680–E689.
- Buckner, R.L., Krienen, F.M., 2013. The evolution of distributed association networks in the human brain. *Trends Cogn. Sci.* 17, 648–665.
- Buckner, R.L., Andrews-Hanna, J.R., Schacter, D.L., 2008. The brain’s default network: anatomy, function, and relevance to disease. *Ann. N. Y. Acad. Sci.* 1124, 1–38.
- Buckner, R.L., Sepulcre, J., Talukdar, T., Krienen, F.M., Liu, H., Hedden, T., Andrews-Hanna, J.R., Sperling, R.A., Johnson, K.A., 2009. Cortical hubs revealed by intrinsic functional connectivity: mapping, assessment of stability, and relation to Alzheimer’s disease. *J. Neurosci.* 29, 1860–1873.
- Buckner, R.L., Snyder, A.Z., Shannon, B.J., LaRossa, G., Sachs, R., Fotenos, A.F., Sheline, Y.I., Klunk, W.E., Mathis, C.A., Morris, J.C., et al., 2005. Molecular, structural, and functional characterization of Alzheimer’s disease: evidence for a relationship between default activity, amyloid, and memory. *J. Neurosci.* 25, 7709–7717.
- Budd, J.M., Kisvárday, Z.F., 2012. Communication and wiring in the cortical connectome. *Front. Neuroanat.* 6, 42.
- Buldyrev, S.V., Parshani, R., Paul, G., Stanley, H.E., Havlin, S., 2010. Catastrophic cascade of failures in interdependent networks. *Nature* 464, 1025–1028.
- Bullmore, E., Sporns, O., 2009. Complex brain networks: graph theoretical analysis of structural and functional systems. *Nat. Rev. Neurosci.* 10, 186–198.
- Bullmore, E., Sporns, O., 2012. The economy of brain network organization. *Nat. Rev. Neurosci.* 13, 336–349.
- Bullmore, E., Brammer, M., Williams, S.C., Rabe-Hesketh, S., Janot, N., David, A., Mellers, J., Howard, R., Sham, P., 1996a. Statistical methods of estimation and inference for functional MR image analysis. *Magn. Reson. Med.* 35, 261–277.
- Bullmore, E., Fadili, J., Maxim, V., Sendur, L., Whitcher, B., Suckling, J., Brammer, M., Breakspear, M., 2004. Wavelets and functional magnetic resonance imaging of the human brain. *NeuroImage* 23 (Suppl. 1), S234–S249.
- Bullmore, E., Long, C., Suckling, J., Fadili, J., Calvert, G., Zelaya, F., Carpenter, T.A., Brammer, M., 2001. Colored noise and computational inference in neurophysiological (fMRI) time series analysis: resampling methods in time and wavelet domains. *Hum. Brain Mapp.* 12, 61–78.
- Bullmore, E.T., Rabe-Hesketh, S., Morris, R.G., Williams, S.C., Gregory, L., Gray, J.A., Brammer, M.J., 1996b. Functional magnetic resonance image analysis of a large-scale neurocognitive network. *NeuroImage* 4, 16–33.
- Bullmore, E.T., Suckling, J., Overmeyer, S., Rabe-Hesketh, S., Taylor, E., Brammer, M.J., 1999. Global, voxel, and cluster tests, by theory and permutation, for a difference between two groups of structural MR images of the brain. *IEEE Trans. Med. Imaging* 18 (1), 32–42.

- Burges, C.J.C., 1998. A tutorial on support vector machines for pattern recognition. *Data Min. Knowl. Disc.* 2 (2), 121–167.
- Buschman, T.J., Miller, E.K., 2007. Top-down versus bottom-up control of attention in the prefrontal and posterior parietal cortices. *Science* 315, 1860–1862.
- Bush, E.C., Allman, J.M., 2003. The scaling of white matter to gray matter in cerebellum and neocortex. *Brain Behav. Evol.* 61, 1–5.
- Butts, C.T., 2009. Revisiting the foundations of network analysis. *Science* 325, 414–416.
- Buzsáki, G., 2006. *Rhythms of the Brain*. Oxford University Press, New York, NY.
- Buzsáki, G., Anastassiou, C.A., Koch, C., 2012. The origin of extracellular fields and currents—EEG, ECoG, LFP and spikes. *Nat. Rev. Neurosci.* 13, 407–420.
- Buzsáki, G., Draguhn, A., 2004. Neuronal oscillations in cortical networks. *Science* 304, 1926–1929.
- Buzsáki, G., Mizuseki, K., 2014. The log-dynamic brain: how skewed distributions affect network operations. *Nat. Rev. Neurosci.* 15, 264–278.
- Buzsáki, G., Logothetis, N., Singer, W., 2013. Scaling brain size, keeping timing: evolutionary preservation of brain rhythms. *Neuron* 80, 751–764.
- Cabral, J., Hugues, E., Kringselbach, M.L., Deco, G., 2012. Modeling the outcome of structural disconnection on resting-state functional connectivity. *NeuroImage* 62, 1342–1353.
- Calabrese, E., Badea, A., Cofer, G., Qi, Y., Johnson, G.A., 2015. A diffusion MRI tractography connectome of the mouse brain and comparison with neuronal tracer data. *Cereb. Cortex* 25 (11), 4628–4637.
- Calamante, F., Smith, R.E., Tournier, J.D., Raffelt, D., Connelly, A., 2015. Quantification of voxel-wise total fibre density: investigating the problems associated with track-count mapping. *NeuroImage* 117, 284–293.
- Callaway, D.S., Newman, M.E.J., Strogatz, S.H., Watts, D.J., 2000. Network robustness and fragility: percolation on random graphs. *Phys. Rev. Lett.* 85, 5468–5471.
- Canolty, R.T., Knight, R.T., 2010. The functional role of cross-frequency coupling. *Trends Cogn. Sci.* 14, 506–515.
- Chang, C., Glover, G.H., 2009. Relationship between respiration, end-tidal CO₂, and BOLD signals in resting-state functional MRI. *NeuroImage* 47, 1381–1393.
- Chang, C., Glover, G.H., 2010. Time-frequency dynamics of resting-state brain connectivity measured with fMRI. *NeuroImage* 50, 81–98.
- Chatterjee, N., Sinha, S., 2008. Understanding the mind of a worm: hierarchical network structure underlying nervous system function in *C. elegans*. *Prog. Brain Res.* 168, 145–153.
- Chen, B.L., Hall, D.H., Chklovskii, D.B., 2006. Wiring optimization can relate neuronal structure and function. *Proc. Natl. Acad. Sci. U. S. A.* 103, 4723–4728.
- Chen, J., Jann, K., Wang, D.J., 2015. Characterizing resting-state brain function using arterial-spin labeling. *Brain Connect.* 5, 527–542.
- Chen, Y., Paul, G., Cohen, R., Havlin, S., Borgatti, S.P., Liljeros, F., Stanley, H.E., 2007. Percolation theory applied to measures of fragmentation in social networks. *Phys. Rev. E* 75, 046107.
- Chen, Y., Wang, S., Hilgetag, C.C., Zhou, C., 2013. Trade-off between multiple constraints enables simultaneous formation of modules and hubs in neural systems. *PLoS Comput. Biol.* 9, e1002937.
- Chen, Z.J., He, Y., Rosa-Neto, P., Germann, J., Evans, A.C., 2008. Revealing modular architecture of human brain structural networks by using cortical thickness from MRI. *Cereb. Cortex* 18 (11), 2374–2381.
- Cherniak, C., 1990. The bounded brain: toward quantitative neuroanatomy. *J. Cogn. Neurosci.* 2, 58–68.

- Cherniak, C., 1994. Component placement optimization in the brain. *J. Neurosci.* 14, 2418–2427.
- Cherniak, C., Changizi, M., Won Kang, D., 1999. Large-scale optimization of neuron arbors. *Phys. Rev. E* 59, 6001–6009.
- Chialvo, D.R., 2010. Emergent complex neural dynamics. *Nat. Phys.* 6 (10), 744–750.
- Chiang, A.S., Lin, C.Y., Chuang, C.C., Chang, H.M., Hsieh, C.H., Yeh, C.W., Shih, C.T., Wu, J.J., Wang, G.T., Chen, Y.C., Wu, C.C., Chen, G.Y., Ching, Y.T., Lee, P.C., Lin, C.Y., Lin, H.H., Wu, C.C., Hsu, H.W., Huang, Y.A., Chen, J.Y., Chiang, H.J., Lu, C.F., Ni, R.F., Yeh, C.Y., Hwang, J.K., 2011. Three-dimensional reconstruction of brain-wide wiring networks in *Drosophila* at single-cell resolution. *Curr. Biol.* 21 (1), 1–11.
- Chklovskii, D.B., 2004. Synaptic connectivity and neuronal morphology: two sides of the same coin. *Neuron* 43, 609–617.
- Chklovskii, D.B., Koulakov, A.A., 2004. Maps in the brain: what can we learn from them? *Annu. Rev. Neurosci.* 27, 369–392.
- Chklovskii, D.B., Schikorski, T., Stevens, C.F., 2002. Wiring optimization in cortical circuits. *Neuron* 34, 341–347.
- Christie, P., Stroobandt, D., 2000. The interpretation and application of Rent's rule. *IEEE Trans. VLSI Syst.* 8, 639–648.
- Chung, F.R.K., 1997. Spectral Graph Theory. American Mathematical Society, Providence, RI.
- Chung, K., Deisseroth, K., 2013. CLARITY for mapping the nervous system. *Nat. Methods* 10, 508–513.
- Clark, D.D., Sokoloff, L., 1999. Circulation and energy metabolism of the brain. In: Siegel, G.J., Agranoff, B.W., Albers, R.W., Fisher, S.K., Uhler, M.D. (Eds.), *Basic Neurochemistry Molecular, Cellular and Medical Aspects*. Lippincott-Raven, Philadelphia, PA, pp. 637–670.
- Clarke, S., Hall, P., 2009. Robustness of multiple testing procedures against dependence. *Ann. Stat.* 37 (1), 332–358.
- Clauset, A., Shalizi, C.R., Newman, M.E.J., 2009. Power-law distributions in empirical data. *SIAM Rev.* 51, 661–703.
- Coan, A.C., Campos, B.M., Yasuda, C.L., Kubota, B.Y., Bergo, F.P., Guerreiro, C.A., Cendes, F., 2014. Frequent seizures are associated with a network of gray matter atrophy in temporal lobe epilepsy with or without hippocampal sclerosis. *PLoS One* 9, e85843.
- Cohen, A.L., Fair, D.A., Dosenbach, N.U., Miezin, F.M., Dierker, D., Van Essen, D.C., Schlaggar, B.L., Petersen, S.E., 2008. Defining functional areas in individual human brains using resting functional connectivity MRI. *NeuroImage* 41, 45–57.
- Cohen, M.X., 2014. *Analyzing Neural Time Series Data: Theory and Practice*. The MIT Press, Cambridge, MA.
- Cohen, M.X., 2015. Effects of time lag and frequency matching on phase-based connectivity. *J. Neurosci. Methods* 250, 137–146.
- Cohen, R., Erez, K., Ben-Avraham, D., Havlin, S., 2000. Resilience of the Internet to random breakdowns. *Phys. Rev. Lett.* 85, 4626–4628.
- Cole, M.W., Reynolds, J.R., Power, J.D., Repovs, G., Anticevic, A., Braver, T.S., 2013. Multi-task connectivity reveals flexible hubs for adaptive task control. *Nat. Neurosci.* 16, 1348–1355.
- Colizza, V., Flammini, A., Serrano, M.A., Vespignani, A., 2006. Detecting rich-club ordering in complex networks. *Nat. Phys.* 2, 110–115.
- Collin, G., Sporns, O., Mandl, R.C.W., van den Heuvel, M.P., 2014. Structural and functional aspects relating to cost and benefit of rich club organization in the human cerebral cortex. *Cereb. Cortex* 24, 2258–2267.
- Costa, L.D.F., Kaiser, M., Hilgetag, C.C., 2007. Predicting the connectivity of primate cortical networks from topological and spatial node properties. *BMC Syst. Biol.* 1, 16.

- Craddock, R.C., James, G.A., Holtzheimer 3rd., P.E., Hu, X.P., Mayberg, H.S., 2012. A whole brain fMRI atlas generated via spatially constrained spectral clustering. *Hum. Brain Mapp.* 33, 1914–1928.
- Cribben, I., Haraldsdottir, R., Atlas, L.Y., Wager, T.D., Lindquist, M.A., 2012. Dynamic connectivity regression: determining state-related changes in brain connectivity. *NeuroImage* 61 (4), 907–920.
- Crofts, J.J., Higham, D.J., 2009. A weighted communicability measure applied to complex brain networks. *J. R. Soc. Interface* 6 (33), 411–414.
- Crofts, J.J., Higham, D.J., Bosnell, R., Jbabdi, S., Matthews, P.M., Behrens, T.E.J., Johansen-Berg, H., 2011. Network analysis detects changes in the contralesional hemisphere following stroke. *NeuroImage* 54 (1), 161–169.
- Crossley, N.A., Mechelli, A., Vértes, P.E., Winton-Brown, T.T., Patel, A.X., Ginestet, C.E., McGuire, P.K., Bullmore, E.T., 2013. Cognitive relevance of the community structure of the human brain functional coactivation network. *Proc. Natl. Acad. Sci. U. S. A.* 110, 11583–11588.
- Crossley, N.A., Mechelli, A., Scott, J., Carletti, F., Fox, P.T., McGuire, P., Bullmore, E.T., 2014. The hubs of the human connectome are generally implicated in the anatomy of brain disorders. *Brain* 137, 2382–2395.
- Csermely, P., London, A., Wu, L.Y., Uzzi, B., 2013. Structure and dynamics of core/periphery networks. *J. Complex Netw.* 1, 93–123.
- Da Mota, B., Fritsch, V., Varoquaux, G., Banaschewski, T., Barker, G.J., Bokde, A.L.W., Bromberg, M., Conrod, P., Gallinat, J., Garavan, H., et al., 2014. Randomized parcellation based inference. *NeuroImage* 89, 203–215.
- da Silva, F.L., 2004. Functional localization of brain sources using EEG and/or MEG data: volume conductor and source models. *Magn. Reson. Imaging* 22, 1533–1538.
- da Silva, M.R., Ma, H., Zeng, A.-P., 2008. Centrality, network capacity, and modularity as parameters to analyze the core-periphery structure in metabolic networks. *Proc. IEEE* 96, 1411–1420.
- Damoiseaux, J.S., Rombouts, S.A., Barkhof, F., Scheltens, P., Stam, C.J., Smith, S.M., Beckmann, C.F., 2006. Consistent resting-state networks across healthy subjects. *Proc. Natl. Acad. Sci. U. S. A.* 103, 13848–13853.
- Danon, L., Díaz-Guilera, A., Duch, J., Arenas, A., 2005. Comparing community structure identification. *J. Stat. Mech. Theory Exp.* 2005, P09008.
- Darvas, F., Pantazis, D., Kucukaltun-Yildirim, E., Leahy, R.M., 2004. Mapping human brain function with MEG and EEG: methods and validation. *NeuroImage* 23, S289–S299.
- Deco, G., Jirsa, V.K., Robinson, P.A., Breakspear, M., Friston, K., 2008. The dynamic brain: from spiking neurons to neural masses and cortical fields. *PLoS Comput. Biol.* 4, e1000092.
- de Haan, W., Mott, K., van Straaten, E.C.W., Scheltens, P., Stam, C.J., 2012. Activity dependent degeneration explains hub vulnerability in Alzheimer's disease. *PLoS Comput. Biol.* 8, e1002582.
- de Lange, S.C., de Reus, M.A., van den Heuvel, M.P., 2014. The Laplacian spectrum of neural networks. *Front. Comput. Neurosci.* 7, 189.
- de Luca, M., Beckmann, C.F., De Stefano, N., Matthews, P.M., Smith, S.M., 2006. fMRI resting state networks define distinct modes of long-distance interactions in the human brain. *NeuroImage* 29, 1359–1367.
- de Pasquale, F., Della Penna, S., Snyder, A.Z., Marzetti, L., 2012. A cortical core for dynamic integration of functional networks in the resting human brain. *Neuron* 74, 753–764.
- de Reus, M.A., van den Heuvel, M.P., 2013a. Estimating false positives and negatives in brain networks. *NeuroImage* 70, 402–409.
- de Reus, M.A., van den Heuvel, M.P., 2013b. Rich club organization and intermodule communication in the cat connectome. *J. Neurosci.* 33, 12929–12939.
- de Reus, M.A., van den Heuvel, M.P., 2014. Simulated rich club lesioning in brain networks: a scaffold for communication and integration? *Front. Hum. Neurosci.* 8, 647.

- de Reus, M.A., Saenger, V.M., Kahn, R.S., van den Heuvel, M.P., 2014. An edge-centric perspective on the human connectome: link communities in the brain. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 369, 20130527.
- Debanne, D., Bialowas, A., Rama, S., 2013. What are the mechanisms for analogue and digital signalling in the brain? *Nat. Rev. Neurosci.* 14 (1), 63–69.
- Deco, G., Jirsa, V.K., 2012. Ongoing cortical activity at rest: criticality, multistability, and ghost attractors. *J. Neurosci.* 32, 3366–3375.
- Deco, G., Kringselbach, M.L., 2014. Great expectations: using whole-brain computational connectomics for understanding neuropsychiatric disorders. *Neuron* 84, 892–905.
- Deco, G., Jirsa, V.K., Robinson, P.A., Breakspear, M., Friston, K., 2008. The dynamic brain: from spiking neurons to neural masses and cortical fields. *PLoS Comput. Biol.* 4, e1000092.
- Dehaene, S., Kerszberg, M., Changeux, J.P., 1998. A neuronal model of a global workspace in effortful cognitive tasks. *Proc. Natl. Acad. Sci. U. S. A.* 95, 14529–14534.
- Delvenne, J.C., Yaliraki, S.N., 2010. Stability of graph communities across time scales. *Proc. Natl. Acad. Sci. U. S. A.* 107, 12755–12760.
- Denk, W., Horstmann, H., 2004. Serial block-face scanning electron microscopy to reconstruct three-dimensional tissue nanostructure. *PLoS Biol.* 2, e329.
- DeRobertis, E.D.P., Bennett, H.S., 1955. Some features of the submicroscopic morphology of synapses in frog and earthworm. *J. Biophys. Biochem. Cytol.* 1, 47–58.
- Desikan, R.S., Segonne, F., Fischl, B., Quinn, B.T., Dickerson, B.C., Blacker, D., Buckner, R.L., Dale, A.M., Maguire, R.P., Hyman, B.T., Albert, M.S., Killian, R.J., 2006. An automated labeling system for subdividing the human cerebral cortex on MRI scans into gyral based regions of interest. *NeuroImage* 31, 968–980.
- Diamond, J.S., 2002. A broad view of glutamate spillover. *Nat. Neurosci.* 5, 291–292.
- Dice, L.R., 1945. Measures of the amount of ecologic association between species. *Ecology* 26, 297–302.
- Dijkstra, E.W., 1959. A note on two problems in connexion with graphs. *Numer. Math.* 1, 269–271.
- Dong, H.W., 2008. The Allen Reference Atlas: A Digital Color Brain Atlas of C57BL/6J Male Mouse. John Wiley & Sons, Hoboken, NJ.
- Doreian, P., Batagelj, V., Ferligoj, A., 2005. Generalized Blockmodeling. Cambridge University Press, New York, NY.
- Dorogovtsev, S.N., Goltsev, A.V., Mendes, J.F.F., 2006a. k-core organization of complex networks. *Phys. Rev. Lett.* 96, 040601–040604.
- Dorogovtsev, S.N., Goltsev, A.V., Mendes, J.F.F., 2006b. k-core architecture and k-core percolation on complex networks. *Physica D* 224, 7–19.
- Dorogovtsev, S.N., Goltsev, A.V., Mendes, J.F.F., 2008. Critical phenomena in complex networks. *Rev. Mod. Phys.* 80, 1275–1335.
- Dosenbach, N.U., Nardos, B., Cohen, A.L., Fair, D.A., Power, J.D., Church, J.A., Nelson, S.M., Wig, G.S., Vogel, A.C., Lessov-Schlaggar, C.N., et al., 2010. Prediction of individual brain maturity using fMRI. *Science* 329, 1358–1361.
- Downes, J.H., Hammond, M.W., Xydas, D., Spencer, M.C., Becerra, V.M., Warwick, K., Whalley, B.J., Nasuto, S.J., 2012. Emergence of a small-world functional network in cultured neurons. *PLoS Comput. Biol.* 8 (5), e1002522.
- Drakesmith, M., Caeyenberghs, K., Dutt, A., Lewis, G., David, A.S., Jones, D.K., 2015. Overcoming the effects of false positives and threshold bias in graph theoretical analyses of neuroimaging data. *NeuroImage* 118, 313–333.
- Drossel, B., Schwabl, F., 1992. Self-organized critical forest-fire model. *Phys. Rev. Lett.* 69, 1629–1632.
- Dulmage, A.L., Mendelsohn, N.S., 1958. Coverings of bipartite graphs. *Can. J. Math.* 10, 517–534.

- Dunlop, J., Smith, D.G., 1994. *Telecommunications Engineering*. CRC Press, Boca Raton, FL.
- Dwyer, D.B., Harrison, B.J., Yücel, M., Whittle, S., Zalesky, A., Pantelis, C., Allen, N.B., Fornito, A., 2014. Large-scale brain network dynamics supporting adolescent cognitive control. *J. Neurosci.* 34, 14096–14107.
- Dwyer, T., Koren, Y., Marriott, K., 2006. IPSEP-COLA: an incremental procedure for separation constraint layout of graphs. *IEEE Trans. Vis. Comput. Graph.* 12, 821–828.
- Eades, P., 1984. A heuristic for graph drawing. *Congr. Numer.* 42, 149–160.
- Easley, D., Kleinberg, J., 2010. *Networks, Crowds, and Markets: Reasoning About a Highly Connected World*. Cambridge University Press, New York, NY.
- Eguiluz, V.M., Chialvo, D.R., Cecchi, G.A., Baliki, M., Apkarian, A.V., 2005. Scale-free brain functional networks. *Phys. Rev. Lett.* 94, 018102.
- Eickhoff, S.B., Stephan, K.E., Mohlberg, H., Grefkes, C., Fink, G.R., Amunts, K., Zilles, K., 2005. A new SPM toolbox for combining probabilistic cytoarchitectonic maps and functional imaging data. *NeuroImage* 25, 1325–1335.
- Eidsaa, M., Almaas, E., 2013. s-core network decomposition: a generalization of k-core analysis to weighted networks. *Phys. Rev. E* 88, 062819.
- Einevoll, G.T., Kayser, C., Logothetis, N.K., Panzeri, S., 2013. Modelling and analysis of local field potentials for studying the function of cortical circuits. *Nat. Rev. Neurosci.* 14, 770–785.
- Ekman, M., Derrfuss, J., Tittgemeyer, M., Fiebach, C.J., 2012. Predicting errors from reconfiguration patterns in human brain networks. *Proc. Natl. Acad. Sci. U. S. A.* 109 (41), 16714–16719.
- Engel, A.K., Gerloff, C., Hilgetag, C.C., Nolte, G., 2013. Intrinsic coupling modes: multiscale interactions in ongoing brain activity. *Neuron* 80, 867–886.
- Ercsey-Ravasz, M., Markov, N.T., Lamy, C., Van Essen, D.C., Knoblauch, K., Toroczkai, Z., Kennedy, H., 2013. A predictive network model of cerebral cortical connectivity based on a distance rule. *Neuron* 80, 184–197.
- Erdős, P., Rényi, A., 1959. On random graphs. *Publ. Math. Debr.* 6, 290–297.
- Erdős, P., Rényi, A., 1960. On the evolution of random graphs. *Publ. Math. Inst. Hung. Acad. Sci.* 5, 17–61.
- Esquivel, A.V., Rosvall, M., 2011. Compression of flow can reveal overlapping-module organization in networks. *Phys. Rev. X* 1, 021025. 11.
- Estrada, E., Hatano, N., 2008. Communicability in complex networks. *Phys. Rev. E* 77, 036111.
- Expert, P., Evans, T.S., Blondel, V.D., Lambiotte, R., 2011. Uncovering space-independent communities in spatial networks. *Proc. Natl. Acad. Sci. U. S. A.* 108, 7663–7668.
- Fagiolo, G., 2007. Clustering in complex directed networks. *Phys. Rev. E* 76, 026107–026108.
- Fair, D.A., Cohen, A.L., Power, J.D., Dosenbach, N.U.F., Church, J.A., Miezin, F.M., Schlaggar, B.L., Petersen, S.E., 2009. Functional brain networks develop from a “local to distributed” organization. *PLoS Comput. Biol.* 5, e1000381.
- Feinberg, D.A., Moeller, S., Smith, S.M., Auerbach, E., Ramanna, S., Gunther, M., Glasser, M.F., Miller, K.L., Ugurbil, K., Yacoub, E., 2010. Multiplexed echo planar imaging for sub-second whole brain fMRI and fast diffusion imaging. *PLoS One* 5, e15710.
- Felleman, D.J., Van Essen, D.C., 1991. Distributed hierarchical processing in the primate cerebral cortex. *Cereb. Cortex* 1, 1–47.
- Fenno, L., Yizhar, O., Deisseroth, K., 2011. The development and application of optogenetics. *Annu. Rev. Neurosci.* 34, 389–412.
- Ferizi, U., Schneider, T., Panagiotaki, E., Nedjati-Gilani, G., Zhang, H., Wheeler-Kingshott, C.A., Alexander, D.C., 2014. A ranking of diffusion MRI compartment models with in vivo human brain data. *Magn. Reson. Med.* 72, 1785–1792.

- Fillard, P., Descoteaux, M., Goh, A., Gouttard, S., Jeurissen, B., Malcolm, J., Ramirez-Manzanares, A., Reisert, M., Sakaie, K., Tensaouti, F., Yo, T., Mangin, J.F., Poupon, C., 2011. Quantitative evaluation of 10 tractography algorithms on a realistic diffusion MR phantom. *NeuroImage* 56, 220–234.
- Finger, S., Koehler, P.J., Jagella, C., 2004. The von Monakow concept of diaschisis: origins and perspectives. *Arch. Neurol.* 61, 283–288.
- Fischl, B., van der Kouwe, A., Destrieux, C., Halgren, E., Ségonne, F., Salat, D.H., Busa, E., Seidman, L.J., Goldstein, J.M., Kennedy, D., Caviness, V., Makris, N., Rosen, B., Dale, A.M., 2004. Anatomically parcellating the human cerebral cortex. *Cereb. Cortex* 14, 11–22.
- Fisher, R.A., 1935. *The Design of Experiments*. Hafner, New York, NY.
- Fodor, J.A., 1983. *Modularity of Mind: An Essay on Faculty Psychology*. MIT Press, Cambridge, MA.
- Fornito, A., Bullmore, E.T., 2010. What can spontaneous fluctuations of the blood oxygenation-level-dependent signal tell us about psychiatric disorders? *Curr. Opin. Psychiatry* 23, 239–249.
- Fornito, A., Bullmore, E.T., 2014. Reconciling abnormalities of brain network structure and function in schizophrenia. *Curr. Opin. Neurobiol.* 30C, 44–50.
- Fornito, A., Harrison, B.J., Zalesky, A., Simons, J.S., 2012a. Competitive and cooperative dynamics of large-scale brain functional networks supporting recollection. *Proc. Natl. Acad. Sci. U. S. A.* 109 (31), 12788–12793.
- Fornito, A., Yoon, J., Zalesky, A., Bullmore, E.T., Carter, C.S., 2011a. General and specific functional connectivity disturbances in first-episode schizophrenia during cognitive control performance. *Biol. Psychiatry* 70, 64–72.
- Fornito, A., Yucel, M., Wood, S., Stuart, G.W., Buchanan, J.A., Proffitt, T., Anderson, V., Velakoulis, D., Pantelis, C., 2004. Individual differences in anterior cingulate/paracingulate morphology are related to executive functions in healthy males. *Cereb. Cortex* 14, 424–431.
- Fornito, A., Zalesky, A., Breakspear, M., 2013. Graph analysis of the human connectome: promise, progress, and pitfalls. *NeuroImage* 80, 426–444.
- Fornito, A., Zalesky, A., Breakspear, M., 2015. The connectomics of brain disorders. *Nat. Rev. Neurosci.* 16, 159–172.
- Fornito, A., Zalesky, A., Bullmore, E.T., 2010. Network scaling effects in graph analytic studies of human resting-state fMRI data. *Front. Syst. Neurosci.* 4, 22.
- Fornito, A., Zalesky, A., Bassett, D.S., Meunier, D., Ellison-Wright, I., Yücel, M., Wood, S.J., Shaw, K., O'Connor, J., Nertney, D., Mowry, B.J., Pantelis, C., Bullmore, E.T., 2011b. Genetic influences on cost-efficient organization of human cortical functional networks. *J. Neurosci.* 31 (9), 3261–3270.
- Fornito, A., Zalesky, A., Pantelis, C., Bullmore, E.T., 2012b. Schizophrenia, neuroimaging and connectomics. *NeuroImage* 62, 2296–2314.
- Fortunato, S., 2010. Community detection in graphs. *Phys. Rep.* 486, 75–174.
- Fortunato, S., Barthélémy, M., 2007. Resolution limit in community detection. *Proc. Natl. Acad. Sci. U. S. A.* 104, 36–41.
- Foster, J.G., Foster, D.V., Grassberger, P., Paczuski, M., 2010. Edge direction and the structure of networks. *Proc. Natl. Acad. Sci. U. S. A.* 107, 10815–10820.
- Foti, N.J., Hughes, J.M., Rockmore, D.N., 2011. Nonparametric sparsification of complex multiscale networks. *PLoS One* 6 (2), e16431.
- Fox, M.D., Raichle, M.E., 2007. Spontaneous fluctuations in brain activity observed with functional magnetic resonance imaging. *Nat. Rev. Neurosci.* 8, 700–711.
- Fox, M.D., Buckner, R.L., Liu, H., Chakravarty, M.M., Lozano, A.M., Pascual-Leone, A., 2014. Resting-state networks link invasive and noninvasive brain stimulation across diverse psychiatric and neurological diseases. *Proc. Natl. Acad. Sci. U. S. A.* 111, E4367–E4375.

- Fox, M.D., Snyder, A.Z., Vincent, J.L., Raichle, M.E., 2007. Intrinsic fluctuations within cortical systems account for intertrial variability in human behavior. *Neuron* 56, 171–184.
- Fox, M.D., Snyder, A.Z., Vincent, J.L., Corbetta, M., Van Essen, D.C., Raichle, M.E., 2005. The human brain is intrinsically organized into dynamic, anticorrelated functional networks. *Proc. Natl. Acad. Sci. U. S. A.* 102, 9673–9678.
- Fox, M.D., Snyder, A.Z., Zacks, J.M., Raichle, M.E., 2006. Coherent spontaneous activity accounts for trial-to-trial variability in human evoked brain responses. *Nat. Neurosci.* 9, 23–25.
- Fox, M.D., Zhang, D., Snyder, A.Z., Raichle, M.E., 2009. The global signal and observed anticorrelated resting state brain networks. *J. Neurophysiol.* 101, 3270–3283.
- Frank, S.A., 2009. The common patterns of nature. *J. Evol. Biol.* 22, 1563–1585.
- Fred, A.L., Jain, A.K., 2003. Robust data clustering. *IEEE Comput. Soc. Conf. Comput. Vis. Pattern Recognit.* 2, 128–136.
- Freeman, L.C., 1977. A set of measures of centrality based on betweenness. *Sociometry* 40, 35–41.
- Freeman, L.C., 1979. Centrality in social networks. Conceptual clarification. *Soc. Networks* 1, 215–239.
- French, L., Pavlidis, P., 2011. Relationships between gene expression and brain wiring in the adult rodent brain. *PLoS Comput. Biol.* 7 (1), e1001049.
- Freud, S., 1891. On Aphasia: A Critical Study (E. Stengel, Trans.). Imago Publishing Company Limited.
- Freud, S., 1895. Project for a scientific psychology. In: Strachey, J. (Ed.), *The Standard Edition of the Complete Psychological Works of Sigmund Freud*, vol. I. Hogarth, London.
- Friedman, J., Hastie, T., Tibshirani, R., 2008. Sparse inverse covariance estimation with the graphical lasso. *Biostatistics* 9 (3), 432–441.
- Fries, P., 2005. A mechanism for cognitive dynamics: neuronal communication through neuronal coherence. *Trends Cogn. Sci.* 9, 474–480.
- Fries, P., Neuenschwander, S., Engel, A.K., Goebel, R., Singer, W., 2001. Rapid feature selective neuronal synchronization through correlated latency shifting. *Nat. Neurosci.* 4, 194–200.
- Fries, P., Nikolic, D., Singer, W., 2007. The gamma cycle. *Trends Neurosci.* 30, 309–316.
- Friston, K., 2009. Causal modelling and brain connectivity in functional magnetic resonance imaging. *PLoS Biol.* 7, e33.
- Friston, K., Moran, R., Seth, A.K., 2013. Analysing connectivity with Granger causality and dynamic causal modelling. *Curr. Opin. Neurobiol.* 23, 172–178.
- Friston, K.J., 1994. Functional and effective connectivity in neuroimaging: a synthesis. *Hum. Brain Mapp.* 2, 56–78.
- Friston, K.J., 2011. Functional and effective connectivity: a review. *Brain Connect.* 1, 13–36.
- Friston, K.J., Price, C.J., 2011. Modules and brain mapping. *Cogn. Neuropsychol.* 28, 241–250.
- Friston, K.J., Buechel, C., Fink, G.R., Morris, J., Rolls, E., Dolan, R.J., 1997. Psychophysiological and modulatory interactions in neuroimaging. *NeuroImage* 6, 218–229.
- Friston, K.J., Harrison, L., Penny, W., 2003. Dynamic causal modelling. *NeuroImage* 19, 1273–1302.
- Friston, K.J., Kahan, J., Razi, A., Stephan, K.E., Sporns, O., 2014. On nodes and modes in resting state fMRI. *NeuroImage* 99, 533–547.
- Friston, K.J., Li, B., Daunizeau, J., Stephan, K.E., 2011. Network discovery with DCM. *NeuroImage* 56, 1202–1221.
- Frost, B., Diamond, M.I., 2009. Prion-like mechanisms in neurodegenerative diseases. *Nat. Rev. Neurosci.* 11, 155–159.

- Fruchterman, T., Reingold, E.M., 1991. Graph drawing by force-directed placement. *Softw. Pract. Exp.* 21, 1129–1164.
- Fukushima, M., Chao, Z.C., Fujii, N., 2015. Studying brain functions with mesoscopic measurements: advances in electrocorticography for non-human primates. *Curr. Opin. Neurobiol.* 32, 124–131.
- Fulcher, B.D., Fornito, A., 2016. A transcriptional signature of hub connectivity in the mouse connectome. *Proc. Natl. Acad. Sci. U. S. A.* 113, 1435–1440.
- Galen, 1976. *De Locis Affectis*. In: Siegel, R. (Ed.), *Galen on the Affected Parts*. S. Karger AG, Basel, Switzerland.
- Gan, G., Ma, C., Wu, J., 2007. *Data Clustering: Theory, Algorithms, and Applications*. SIAM/ASA, Philadelphia, PA/Alexandria, VA. ASA-SIAM Series on Statistics and Applied Probability.
- Garas, A., Schweitzer, F., Havlin, S., 2012. A k-shell decomposition method for weighted networks. *New J. Phys.* 14, 083030. 15.
- Garcia-Lopez, P., Garcia-Marin, V., Freire, M., 2010. The histological slides and drawings of Cajal. *Front. Neuroanat.* 4, 9.
- Gardner, W.A., 1992. A unifying view of coherence in signal processing. *Signal Process.* 29, 113–140.
- Genovese, C.R., Lazar, N.A., Nichols, T., 2002. Thresholding of statistical maps in functional neuroimaging using the false discovery rate. *NeuroImage* 15-(4), 870–878.
- Gerstein, G.L., Perkel, D.H., 1969. Simultaneously recorded trains of action potentials: analysis and functional interpretation. *Science* 164, 828–830.
- Gerstein, G.L., Perkel, D.H., Subramanian, K.N., 1978. Identification of functionally related neural assemblies. *Brain Res.* 140, 43–62.
- Geschwind, N., 1965a. Disconnection syndromes in animals and man. Part I. *Brain* 88, 237–294.
- Geschwind, N., 1965b. Disconnection syndromes in animals and man. Part II. *Brain* 88, 585–644.
- Geyer, C.J., Thompson, E.A., 1992. Constrained Monte Carlo maximum likelihood for dependent data. *J. R. Stat. Soc. Ser. B* 54, 657–699.
- Gibson, H., Faith, J., Vickers, P., 2013. A survey of two-dimensional graph layout techniques for information visualisation. *Inf. Vis.* 12, 324–357.
- Gibson, W.C., 1962. Pioneers in localization of function in the brain. *J. Am. Med. Assoc.* 180, 944–951.
- Gilbert, E.N., 1959. Random graphs. *Ann. Math. Stat.* 30 (4), 1141–1144.
- Ginestet, C.E., Simmons, A., 2011. Statistical parametric network analysis of functional connectivity dynamics during a working memory task. *NeuroImage* 55 (2), 688–704.
- Ginestet, C.E., Nichols, T.E., Bullmore, E.T., Simmons, A., 2011. Brain network analysis: separating cost from topology using cost-integration. *PLoS One* 6, e21570.
- Girvan, M., Newman, M.E.J., 2002. Community structure in social and biological networks. *Proc. Natl. Acad. Sci. U. S. A.* 99, 7821–7826.
- Glahn, D.C., Winkler, A.M., Kochunov, P., Almasy, L., Duggirala, R., Carless, M.A., Curran, J.C., Olvera, R.L., Laird, A.R., Smith, S.M., Beckmann, C.F., Fox, P.T., Blangero, J., 2010. Genetic control over the resting brain. *Proc. Natl. Acad. Sci. U. S. A.* 107, 1223–1228.
- Glasser, M.F., Van Essen, D.C., 2011. Mapping human cortical areas in vivo based on myelin content as revealed by T1- and T2-weighted MRI. *J. Neurosci.* 31, 11597–11616.
- Gleeson, J.P., 2009. Bond percolation on a class of clustered random networks. *Phys. Rev. E* 80, 036107.
- Godwin, D., Barry, R.L., Marois, R., 2015. Breakdown of the brain's functional network modularity with awareness. *Proc. Natl. Acad. Sci.* 112 (12), 3799–3804.

- Gold, L., Lauritzen, M., 2002. Neuronal deactivation explains decreased cerebellar blood flow in response to focal cerebral ischemia or suppressed neocortical function. *Proc. Natl. Acad. Sci. U. S. A.* 99, 7699–7704.
- Gollo, L.L., Mirasso, C., Sporns, O., Breakspear, M., 2014. Mechanisms of zero-lag synchronization in cortical motifs. *PLoS Comput. Biol.* 10, e1003548.
- Gollo, L.L., Zalesky, A., Hutchison, R.M., van den Heuvel, M., Breakspear, M., 2015. Dwelling quietly in the rich club: brain network determinants of slow cortical fluctuations. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 370, 20140165.
- Goltsev, A.V., Dorogovtsev, S.N., Mendes, J., 2006. k-core (bootstrap) percolation on complex networks: critical phenomena and nonlocal effects. *Phys. Rev. E* 73, 056101.
- Gómez-Gardenes, J., Zamora-López, G., Moreno, Y., Arenas, A., 2010. From modular to centralized organization of synchronization in functional areas of the cat cerebral cortex. *PLoS One* 5, e12303.
- Gómez, S., Jensen, P., Arenas, A., 2009. Analysis of community structure in networks of correlated data. *Phys. Rev. E* 80, 016114.
- Gong, G., He, Y., Concha, L., Lebel, C., Gross, D.W., Evans, A.C., Beaulieu, C., 2009. Mapping anatomical connectivity patterns of human cerebral cortex using in vivo diffusion tensor imaging tractography. *Cereb. Cortex* 19, 524–536.
- Goñi, J., Avena-Koenigsberger, A., Velez de Mendizabal, N., van den Heuvel, M.P., Betzel, R.F., Sporns, O., 2013. Exploring the morphospace of communication efficiency in complex networks. *PLoS One* 8, e58070.
- Goñi, J., van den Heuvel, M.P., Avena-Koenigsberger, A., Velez de Mendizabal, N., Betzel, R.F., Griffa, A., Hagmann, P., Corominas-Murtra, B., Thiran, J.P., Sporns, O., 2014. Resting-brain functional connectivity predicted by analytic measures of network communication. *Proc. Natl. Acad. Sci. U. S. A.* 111 (2), 833–838.
- Good, B.H., de Montjoye, Y.A., Clauset, A., 2010. Performance of modularity maximization in practical contexts. *Phys. Rev. E* 81, 046106.
- Good, P., 1994. Permutation Tests. A Practical Guide to Resampling Methods for Testing Hypotheses. Springer Verlag, New York, NY.
- Grady, D., Thiemann, C., Brockmann, D., 2012. Robust classification of salient links in complex networks. *Nat. Commun.* 3, 864.
- Graham, D., 2014. Routing in the brain. *Front. Comput. Neurosci.* 8, 44.
- Graham, D., Rockmore, D., 2011. The packet switching brain. *J. Cogn. Neurosci.* 23 (2), 267–276.
- Granovetter, M., 1978. Threshold models of collective behavior. *Am. J. Sociol.* 83, 1420–1443.
- Gray, C.M., Singer, W., 1989. Stimulus-specific neuronal oscillations in orientation columns of the visual cortex. *Proc. Natl. Acad. Sci. U. S. A.* 86, 1698–1702.
- Gray, C.M., König, P., Engel, A.K., Singer, W., 1989. Oscillatory responses in cat visual cortex exhibit inter-columnar synchronization which reflects global stimulus properties. *Nature* 338, 334–337.
- Greenblatt, R.E., Pflieger, M.E., Ossadtchi, A.E., 2012. Connectivity measures applied to human brain electrophysiological data. *J. Neurosci. Methods* 207, 1–16.
- Gregoriou, G.G., Gotts, S.J., Zhou, H., Desimone, R., 2009. High-frequency, long-range coupling between prefrontal and visual cortex during attention. *Science* 324, 1207–1210.
- Gregory, S., 2007. An algorithm to find overlapping community structure in networks. In: Koronacki, J., Lopez de Mantaras, R., Matwin, S., Mladenić, D., Skowron, A. (Eds.), *Knowledge Discovery in Databases: PKDD 2007*. Springer, Berlin, pp. 91–102.
- Gregory, S., 2010. Finding overlapping communities in networks by label propagation. *New J. Phys.* 12, 103018.

- Grienberger, C., Konnerth, A., 2012. Imaging calcium in neurons. *Neuron* 73, 862–885.
- Guevara, M.A., Corsi-Cabrera, M., 1996. EEG coherence or EEG correlation? *Int. J. Psychophysiol.* 23, 145–153.
- Guimerà, R., Amaral, L.N., 2005. Functional cartography of complex metabolic networks. *Nature* 433, 895–900.
- Guimerà, R., Mossa, S., Turtschi, A., Amaral, L.A.N., 2005. The worldwide air transportation network: anomalous centrality, community structure, and cities' global roles. *Proc. Natl. Acad. Sci. U. S. A.* 102, 7794–7799.
- Guimerà, R., Sales-Pardo, M., Amaral, L., 2004. Modularity from fluctuations in random graphs and complex networks. *Phys. Rev. E* 70, 025101.
- Gulyás, A., Bíró, J.J., Kőrösi, A., Rétvári, G., Krioukov, D., 2015. Navigable networks as Nash equilibria of navigation games. *Nat. Commun.* 6, 7651.
- Gururangan, S.S., Sadovsky, A.J., MacLean, J.N., 2014. Analysis of graph invariants in functional neocortical circuitry reveals generalized features common to three areas of sensory cortex. *PLoS Comput. Biol.* 10, e1003710–e1003712.
- Hagmann, P., 2005. From diffusion MRI to brain connectomics. PhD Thesis, Ecole Polytechnique Fédérale de Lausanne, Lausanne.
- Hagmann, P., Cammoun, L., Gigandet, X., Meuli, R., Honey, C.J., Wedeen, V.J., Sporns, O., 2008. Mapping the structural core of human cerebral cortex. *PLoS Biol.* 6, e159.
- Hagmann, P., Kurant, M., Gigandet, X., Thiran, P., Wedeen, V.J., Meuli, R., Thiran, J.P., 2007. Mapping human whole-brain structural networks with diffusion MRI. *PLoS One* 2, e597.
- Haimovici, A., Tagliazucchi, E., Balenzuela, P., Chialvo, D.R., 2013. Brain organization into resting state networks emerges at criticality on a model of the human connectome. *Phys. Rev. Lett.* 110, 178101.
- Hämäläinen, M., Hari, R., Ilmoniemi, R.J., Knuutila, J., 1993. Magnetoencephalography—theory, instrumentation, and applications to noninvasive studies of the working human brain. *Rev. Mod. Phys.* 65, 413–497.
- Harary, F., Palmer, E.M., 1973. Graphical Enumeration. Academic Press, New York, NY.
- Hari, R., Parkkonen, L., Nangini, C., 2010. The brain in time: insights from neuromagnetic recordings. *Ann. N. Y. Acad. Sci.* 1191, 89–109.
- Harlow, J.M., 1848. Passage of an iron rod through the head. *Boston Med. Surg. J.* 39, 389–393.
- Harriger, L., van den Heuvel, M.P., Sporns, O., 2012. Rich club organization of macaque cerebral cortex and its role in network communication. *PLoS One* 7, e46497.
- Harrison, B.J., Pujol, J., Ortiz, H., Fornito, A., Pantelis, C., Yucel, M., 2008. Modulation of brain resting-state networks by sad mood induction. *PLoS One* 3, e794.
- Hawellek, D.J., Hipp, J.F., Lewis, C.M., Corbetta, M., Engel, A.K., 2011. Increased functional connectivity indicates the severity of cognitive impairment in multiple sclerosis. *Proc. Natl. Acad. Sci. U. S. A.* 108, 19066–19071.
- Hayasaka, S., Laurienti, P.J., 2010. Comparison of characteristics between region-and voxel-based network analyses in resting-state fMRI data. *NeuroImage* 50, 499–508.
- Hayworth, K.J., Kasthuri, N., Schalek, R., 2006. Automating the collection of ultrathin serial sections for large volume TEM reconstructions. *Microsc. Microanal.* 12, 86–87.
- Hazy, T.E., Frank, M.J., O'reilly, R.C., 2007. Towards an executive without a homunculus: computational models of the prefrontal cortex/basal ganglia system. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 362, 1601–1613.
- He, B., Yang, L., Wilke, C., Yuan, H., 2011. Electrophysiological imaging of brain activity and connectivity—challenges and opportunities. *IEEE Trans. Biomed. Eng.* 58, 1918–1931.

- He, B.J., 2011. Scale-free properties of the functional magnetic resonance imaging signal during rest and task. *J. Neurosci.* 31, 13786–13795.
- He, B.J., Raichle, M.E., 2009. The fMRI signal, slow cortical potential and consciousness. *Trends Cogn. Sci.* 13, 302–309.
- He, B.J., Snyder, A.Z., Zempel, J.M., Smyth, M.D., Raichle, M.E., 2008. Electrophysiological correlates of the brain's intrinsic large-scale functional architecture. *Proc. Natl. Acad. Sci. U. S. A.* 105, 16039–16044.
- He, B.J., Zempel, J.M., Snyder, A.Z., Raichle, M.E., 2010. The temporal structures and functional significance of scale-free brain activity. *Neuron* 66, 353–369.
- He, Y., Chen, Z.J., Evans, A.C., 2007. Small-world anatomical networks in the human brain revealed by cortical thickness from MRI. *Cereb. Cortex* 17, 2407–2419.
- Hebb, D.O., 1949. *The Organization of Behavior. A Neuropsychological Theory*. Routledge, New York, NY.
- Helmstaedter, M., 2013. Cellular-resolution connectomics: challenges of dense neural circuit reconstruction. *Nat. Methods* 10, 501–507.
- Helmstaedter, M., Briggman, K.L., Turaga, S.C., Jain, V., Seung, H.S., Denk, W., 2013. Connectomic reconstruction of the inner plexiform layer in the mouse retina. *Nature* 500, 168–174.
- Henderson, J.A., Robinson, P.A., 2011. Geometric effects on complex network structure in the cortex. *Phys. Rev. Lett.* 107, 018102.
- Henderson, J.A., Robinson, P.A., 2013. Using geometry to uncover relationships between isotropy, homogeneity, and modularity in cortical connectivity. *Brain Connect.* 3, 423–437.
- Henderson, J.A., Robinson, P.A., 2014. Relations between the geometry of cortical gyration and white-matter network architecture. *Brain Connect.* 4, 112–130.
- Herculano-Houzel, S., 2012. The remarkable, yet not extraordinary, human brain as a scaled-up primate brain and its associated cost. *Proc. Natl. Acad. Sci. U. S. A.* 109, 10661–10668.
- Herculano-Houzel, S., Mota, B., Wong, P., Kaas, J.H., 2010. Connectivity-driven white-matter scaling and folding in primate cerebral cortex. *Proc. Natl. Acad. Sci. U. S. A.* 107, 19008–19013.
- Hesselmann, G., Kell, C.A., Eger, E., Kleinschmidt, A., 2008. Spontaneous local variations in ongoing neural activity bias perceptual decisions. *Proc. Natl. Acad. Sci. U. S. A.* 105, 10984–10989.
- Hilgetag, C.C., Goulas, A., 2016. Is the brain really a small-world network? *Brain Struct. Funct.* 1–6. <http://dx.doi.org/10.1007/s00429-015-1035-6>.
- Hilgetag, C.C., Kaiser, M., 2004. Clustered organization of cortical connectivity. *Neuroinformatics* 2, 353–360.
- Hilgetag, C.C., Burns, G.A., O'Neill, M.A., Scannell, J.W., Young, M.P., 2000. Anatomical connectivity defines the organization of clusters of cortical areas in the macaque monkey and the cat. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 355, 91–110.
- Hinrichs, C., Ithapu, V.K., Sun, Q., Johnson, S.C., Singh, V., 2013. Speeding up permutation testing in neuroimaging. *Adv. Neural Inf. Process. Syst.* 2013, 890–898.
- Hipp, J.F., Engel, A.K., Siegel, M., 2011. Oscillatory synchronization in large-scale cortical networks predicts perception. *Neuron* 69, 387–396.
- Hirokawa, N., Niwa, S., Tanaka, Y., 2010. Molecular motors in neurons: transport mechanisms and roles in brain function, development, and disease. *Neuron* 68, 610–638.
- Hirschberger, M., Qi, Y., Steuer, R.E., 2007. Randomly generating portfolio-selection covariance matrices with specified distributional characteristics. *Eur. J. Oper. Res.* 177 (3), 1610–1625.
- Holm, S., 1979. A simple sequentially rejective multiple test procedure. *Scand. J. Stat. 6* (2), 65–70.

- Holme, P., 2005. Core-periphery organization of complex networks. *Phys. Rev. E* 72, 046111–046114.
- Honey, C.J., Sporns, O., 2008. Dynamical consequences of lesions in cortical networks. *Hum. Brain Mapp.* 29, 802–809.
- Honey, C.J., Kötter, R., Breakspear, M., Sporns, O., 2007. Network structure of cerebral cortex shapes functional connectivity on multiple time scales. *Proc. Natl. Acad. Sci. U. S. A.* 104, 10240–10245.
- Honey, C.J., Sporns, O., Cammoun, L., Gigandet, X., Thiran, J.P., Meuli, R., Hagmann, P., 2009. Predicting human resting-state functional connectivity from structural connectivity. *Proc. Natl. Acad. Sci. U. S. A.* 106, 2035–2040.
- Hong, H., Choi, M.Y., Kim, B.J., 2002. Synchronization on small-world networks. *Phys. Rev. E* 65, 026139.
- Horwitz, B., 2003. The elusive concept of brain connectivity. *NeuroImage* 19 (2), 466–470.
- Hubel, D.H., Wiesel, T.N., 1959. Receptive fields of single neurones in the cat's striate cortex. *J. Physiol.* 148, 574–591.
- Hubert, L., Arabie, P., 1985. Comparing partitions. *J. Classif.* 2, 193–218.
- Huettel, S.A., Song, A.W., McCarthy, G., 2014. Functional Magnetic Resonance Imaging, third ed. Sinauer Associates, Sunderland, MA.
- Humphries, M.D., Gurney, K., 2008. Network "small-world-ness": a quantitative method for determining canonical network equivalence. *PLoS One* 3 (4), e0002051.
- Humphries, M.D., Gurney, K., Prescott, T.J., 2006. The brainstem reticular formation is a small-world, not scale-free, network. *Proc. Biol. Sci.* 273, 503–511.
- Hunter, D.R., Handcock, M.S., Butts, C.T., Goodreau, S.M., Morris, M., 2008. ergm: a package to fit, simulate and diagnose exponential-family models for networks. *J. Stat. Softw.* 24 (3), 1–29. nihpa54860.
- Hutchison, R.M., Womelsdorf, T., Allen, E.A., Bandettini, P.A., Calhoun, V.D., Corbetta, M., Della Penna, S., Duyn, J.H., Glover, G.H., Gonzalez-Castillo, J., et al., 2013. Dynamic functional connectivity: promise, issues, and interpretations. *NeuroImage* 80, 360–378.
- Ing, A., Schwarzbauer, C., 2014. Cluster size statistic and cluster mass statistic: two novel methods for identifying changes in functional connectivity between groups or conditions. *PLoS One* 9 (6), e98697.
- Irimia, A., Van Horn, J.D., 2014. Systematic network lesioning reveals the core white matter scaffold of the human brain. *Front. Hum. Neurosci.* 8, 51.
- Irimia, A., Chambers, M.C., Torgerson, C.M., Van Horn, J.D., 2012. Circular representation of human cortical networks for subject and population-level connectomic visualization. *NeuroImage* 60, 1340–1351.
- Isenberg, T., 2015. A survey of illustrative visualization techniques for DTI-based fiber tracking. In: Schulz, T., Hotz, I. (Eds.), *Visualization and Processing of Higher Order Descriptors for Multi-Valued Data*. Springer, London, pp. 235–256.
- Iturria-Medina, Y., Sotero, R.C., Canales-Rodriguez, E.J., Aleman-Gomez, Y., Melie-Garcia, L., 2008. Studying the human brain anatomical network via diffusion-weighted MRI and graph theory. *NeuroImage* 40, 1064–1076.
- Jaccard, P., 1912. The distribution of the flora in the alpine zone. *New Phytol.* 11, 37–50.
- Jain, A.K., Murty, M.N., Flynn, P.J., 1999. Data clustering: a review. *ACM Comput. Surv.* 31, 264–323.
- Jarrell, T.A., Wang, Y., Bloniarz, A.E., Brittin, C.A., Xu, M., Thomson, J.N., Albertson, D.G., Hall, D.H., Emmons, S.W., 2012. The connectome of a decision-making neural network. *Science* 337, 437–444.

- Jennings, J.H., Stuber, G.D., 2014. Tools for resolving functional activity and review connectivity within intact neural circuits. *Curr. Biol.* 24, R41–R50.
- Jiang, Z.-Q., Zhou, W.-X., 2008. Statistical significance of the rich-club phenomenon in complex networks. *New J. Phys.* 10, 043002–043010.
- Johansen-Berg, H., Rushworth, M.F.S., 2009. Using diffusion imaging to study human connectional anatomy. *Annu. Rev. Neurosci.* 32, 75–94.
- Johansen-Berg, H., Rushworth, M.F., Bogdanovic, M.D., Kischka, U., Wimalaratna, S., Matthews, P.M., 2002. The role of ipsilateral premotor cortex in hand movement after stroke. *Proc. Natl. Acad. Sci. U. S. A.* 99, 14518–14523.
- Jones, D.K., Knösche, T.R., Turner, R., 2013. White matter integrity, fiber count, and other fallacies: the do's and don'ts of diffusion MRI. *NeuroImage* 73, 239–254.
- Jung, J.C., 2004. In vivo mammalian brain imaging using one- and two-photon fluorescence micro-endoscopy. *J. Neurophysiol.* 92, 3121–3133.
- Juran, J., 2005. Critical Evaluations in Business and Management. Routledge, New York, NY.
- Jutla, I., Jeub, L., Mucha, P.J., 2011. A generalized Louvain method for community detection implemented in MATLAB. <http://netwiki.amath.unc.edu/GenLouvain>.
- Kaiser, M., 2008. Mean clustering coefficients: the role of isolated nodes and leafs on clustering measures for small-world networks. *New J. Phys.* 10, 083042.
- Kaiser, M., Hilgetag, C.C., 2004. Modelling the development of cortical systems networks. *Neurocomputing* 58–60, 297–302.
- Kaiser, M., Hilgetag, C.C., 2006. Nonoptimal component placement, but short processing paths due to long-distance projections in neural systems. *PLoS Comput. Biol.* 2, e95.
- Kaiser, M., Goerner, M., Hilgetag, C.C., 2007a. Criticality of spreading dynamics in hierarchical cluster networks without inhibition. *New J. Phys.* 9, 1–13.
- Kaiser, M., Martin, R., Andras, P., Young, M.P., 2007b. Simulation of robustness against lesions of cortical networks. *Eur. J. Neurosci.* 25, 3185–3192.
- Kamada, T., Kawai, S., 1989. An algorithm for drawing general undirected graphs. *Inf. Process. Lett.* 31, 7–15.
- Kanai, R., Rees, G., 2011. The structural basis of inter-individual differences in human behaviour and cognition. *Nat. Rev. Neurosci.* 12, 231–242.
- Kandel, E.R., Markram, H., Matthews, P.M., Yuste, R., Koch, C., 2013. Neuroscience thinks big (and collaboratively). *Nat. Rev. Neurosci.* 14, 659–664.
- Kaplan, T.D., Forrest, S., 2008. A dual assortative measure of community structure. [arXiv:0801.3290v1](https://arxiv.org/abs/0801.3290v1).
- Karrer, B., Levina, E., Newman, M.E.J., 2008. Robustness of community structure in networks. *Phys. Rev. E* 77, 046119.
- Kashtan, N., Alon, U., 2005. Spontaneous evolution of modularity and network motifs. *Proc. Natl. Acad. Sci. U. S. A.* 102, 13773–13778.
- Katz, L., 1953. A new status index derived from sociometric analysis. *Psychometrika* 18, 39–43.
- Kelly, A.M., Uddin, L.Q., Biswal, B.B., Castellanos, F.X., Milham, M.P., 2008. Competition between functional brain networks mediates behavioral variability. *NeuroImage* 39, 527–537.
- Kenet, T., Bibitchkov, D., Tsodyks, M., Grinvald, A., Arieli, A., 2003. Spontaneously emerging cortical representations of visual attributes. *Nature* 425, 954–956.
- Kennedy, H., Knoblauch, K., Toroczkai, Z., 2013. Why data coherence and quality is critical for understanding interareal cortical networks. *NeuroImage* 80, 37–45.

- Kerr, J.N.D., Greenberg, D., Helmchen, F., 2005. Imaging input and output of neocortical networks in vivo. *Proc. Natl. Acad. Sci. U. S. A.* 102, 14063–14068.
- Khundrakpam, B.S., Reid, A., Brauer, J., Carbonell, F., Lewis, J., Ameis, S., Karama, S., Lee, J., Chen, Z., Das, S., et al., 2013. Developmental changes in organization of structural brain networks. *Cereb. Cortex* 23, 2072–2085.
- Killworth, P., Bernard, H., 1978. The reversal small world experiment. *Soc. Networks* 1, 159–192.
- Kim, J., Wozniak, J.R., Mueller, B.A., Shen, X., Pan, W., 2014. Comparison of statistical tests for group differences in brain functional networks. *NeuroImage* 101, 681–694.
- Kim, Y., Son, S.-W., Jeong, H., 2010. Finding communities in directed networks. *Phys. Rev. E* 81, 016103–016109.
- Kitano, H., 2004. Biological robustness. *Nat. Rev. Genet.* 5, 826–837.
- Kitzbichler, M.G., Henson, R.N.A., Smith, M.L., Nathan, P.J., Bullmore, E.T., 2011. Cognitive effort drives workspace configuration of human brain functional networks. *J. Neurosci.* 31 (22), 8259–8270.
- Kitzbichler, M.G., Khan, S., Ganesan, S., Vangel, M.G., Herbert, M.R., Hämäläinen, M.S., Kenet, T., 2015. Altered development and multifaceted band-specific abnormalities of resting state networks in autism. *Biol. Psychiatry* 77, 794–804.
- Kitzbichler, M.G., Smith, M.L., Christensen, S.R., Bullmore, E., 2009. Broadband criticality of human brain network synchronization. *PLoS Comput. Biol.* 5, e1000314.
- Kivelä, M., Arenas, A., Barthelemy, M., Gleeson, J.P., Moreno, Y., Porter, M.A., 2014. Multilayer networks. *J. Complex Netw.* 2, 203–271.
- Kiviniemi, V., Starck, T., Remes, J., Long, X., Nikkinen, J., Haapea, M., Veijola, J., Moilanen, I., Isohanni, M., Zang, Y.F., et al., 2009. Functional segmentation of the brain cortex using high model order group PICA. *Hum. Brain Mapp.* 30, 3865–3886.
- Klar, T.A., Jakobs, S., Dyba, M., Egner, A., Hell, S.W., 2000. Fluorescence microscopy with diffraction resolution barrier broken by stimulated emission. *Proc. Natl. Acad. Sci. U. S. A.* 97, 8206–8210.
- Kleinberg, J.M., 2000. Navigation in a small world. *Nature* 406, 845.
- Kleinfeld, D., Bharioke, A., Blinder, P., Bock, D.D., Briggman, K.L., Chklovskii, D.B., Denk, W., Helmstaedter, M., Kausholt, J.P., Lee, W.C.A., et al., 2011. Large-scale automated histology in the pursuit of connectomes. *J. Neurosci.* 31, 16125–16138.
- Klemm, K., Eguíluz, V.M., 2002. Highly clustered scale-free networks. *Phys. Rev. E* 65, 036123.
- Klimm, F., Bassett, D.S., Carlson, J.M., Mucha, P.J., 2014. Resolving structural variability in network models and the brain. *PLoS Comput. Biol.* 10, e1003491. 22.
- Klyachko, V.A., Stevens, C.F., 2003. Connectivity optimization and the positioning of cortical areas. *Proc. Natl. Acad. Sci. U. S. A.* 100, 7937–7941.
- Knösche, T.R., Anwander, A., Liptrot, M., Dyrby, T.B., 2015. Validation of tractography: comparison with manganese tracing. *Hum. Brain Mapp.* 36 (10), 4116–4134.
- Kobourov, S.G., 2013. Force-directed drawing algorithms. In: Tamassia, R. (Ed.), *Handbook of Graph Drawing and Visualization*. CRC Press, Boca Raton, FL, pp. 383–408.
- Kopell, N., Ermentrout, G.B., Whittington, M.A., Traub, R.D., 2000. Gamma rhythms and beta rhythms have different synchronization properties. *Proc. Natl. Acad. Sci. U. S. A.* 97, 1867–1872.
- Kraitchik, M., 1942. *Mathematical Recreations*. W.W. Norton, New York, NY, pp. 209–211, §8.4.1.
- Krishnan, A., Williams, L.J., McIntosh, A.R., Abdi, H., 2011. Partial least squares (PLS) methods for neuroimaging: a tutorial and review. *NeuroImage* 56 (2), 455–475.

- Kruskal, J., 1964. Multidimensional scaling by optimizing goodness of fit to nonmetric hypothesis. *Psychometrika* 29, 1–27.
- Krzywinski, M., Birol, I., Jones, S.J., Marra, M.A., 2012. Hive plots—rational approach to visualizing networks. *Brief. Bioinform.* 13, 627–644.
- Kuncheva, L., Hadjitodorov, S.T., 2004. Using diversity in cluster ensembles. *IEEE Int. Conf. Syst. Man Cybern.* 2, 1214–1219.
- Kundu, P., Brenowitz, N.D., Voon, V., Worbe, Y., Vértes, P.E., Inati, S.J., Saad, Z.S., Bandettini, P.A., Bullmore, E.T., 2013. Integrated strategy for improving functional connectivity mapping using multiecho fMRI. *Proc. Natl. Acad. Sci. U. S. A.* 110, 16187–16192.
- Lachaux, J.P., Rodriguez, E., Martinerie, J., Varela, F.J., 1999. Measuring phase synchrony in brain signals. *Hum. Brain Mapp.* 8, 194–208.
- Lago-Fernández, L.F., Huerta, R., Corbacho, F., Sigüenza, J.A., 2000. Fast response and temporal coherent oscillations in small-world networks. *Phys. Rev. Lett.* 84, 2758–2761.
- Lancichinetti, A., Fortunato, S., 2009. Community detection algorithms: a comparative analysis. *Phys. Rev. E* 80, 056117.
- Lancichinetti, A., Fortunato, S., 2011. Limits of modularity maximization in community detection. *Phys. Rev. E* 84, 066122–066128.
- Lancichinetti, A., Fortunato, S., 2012. Consensus clustering in complex networks. *Sci. Rep.* 2, 336.
- Lancichinetti, A., Radicchi, F., Ramasco, J.J., 2010. Statistical significance of communities in networks. *Phys. Rev. E* 81, 046110–046119.
- Lanciego, J.L., Wouterlood, F.G., 2011. A half century of experimental neuroanatomical tracing. *J. Chem. Neuroanat.* 42, 157–183.
- Landman, B.S., Russo, R.L., 1971. On a pin versus block relationship for partitions of logic graphs. *IEEE Trans. Comput. C-20*, 1469–1479.
- Latora, V., Marchiori, M., 2001. Efficient behavior of small-world networks. *Phys. Rev. Lett.* 87, 198701.
- Latora, V., Marchiori, M., 2003. Economic small-world behavior in weighted networks. *Eur. Phys. J. B* 32, 249–263.
- Latora, V., Marchiori, M., 2007. A measure of centrality based on network efficiency. *New J. Phys.* 9, 188.
- Laughlin, S.B., Sejnowski, T.J., 2003. Communication in neuronal networks. *Science* 301, 1870–1874.
- Leek, J.T., Storey, J.D., 2008. A general framework for multiple testing dependence. *Proc. Natl. Acad. Sci. U. S. A.* 105 (48), 18718–18723.
- Lehmann, E.L., Romano, J.P., 2005. Generalizations of the familywise error rate. *Ann. Stat.* 33 (3), 1138–1154.
- Leicht, E.A., Newman, M.E.J., 2008. Community structure in directed networks. *Phys. Rev. Lett.* 100, 118703–118704.
- Lennie, P., 2003. The cost of cortical computation. *Curr. Biol.* 13, 493–497.
- Leonardi, N., Van De Ville, D., 2015. On spurious and real fluctuations of dynamic functional connectivity during rest. *NeuroImage* 104, 430–436.
- Lerch, J.P., Worsley, K., Shaw, W.P., Greenstein, D.K., Lenroot, R.K., Giedd, J., Evans, A.C., 2006. Mapping anatomical correlations across cerebral cortex (MACACC) using cortical thickness from MRI. *NeuroImage* 31, 993–1003.
- Lewis, C.M., Baldassarre, A., Committeri, G., Romani, G.L., Corbetta, M., 2009. Learning sculpts the spontaneous activity of the resting human brain. *Proc. Natl. Acad. Sci. U. S. A.* 106, 17558–17563.

- Leyzorek, M., Gray, R.S., Johnson, A.A., Ladew, W.C., Meaker Jr., S.R., Petry, R.M., Seitz, R.N., 1957. Investigation of Model Techniques. First Annual Report, 6 June 1956–1 July 1957. A Study of Model Techniques for Communication Systems. Case Institute of Technology, Cleveland, OH.
- Li, J., Ji, L., 2005. Adjusting multiple testing in multilocus analyses using the eigenvalues of a correlation matrix. *Heredity (Edinb.)* 95 (3), 221–227.
- Li, L., Rilling, J.K., Preuss, T.M., Glasser, M.F., 2012. The effects of connection reconstruction method on the interregional connectivity of brain networks via diffusion tractography. *Hum. Brain Mapp.* 33, 1894–1913.
- Li, S.C., Lindenberger, U., Sikström, S., 2001. Aging cognition: from neuromodulation to representation. *Trends Cogn. Sci.* 5, 479–486.
- Li, Y., Jewells, V., Kim, M., Chen, Y., Moon, A., Armao, D., Troiani, L., Markovic-Plese, S., Lin, W., Shen, D., 2013. Diffusion tensor imaging based network analysis detects alterations of neuro-connectivity in patients with clinically early relapsing-remitting multiple sclerosis. *Hum. Brain Mapp.* 34 (12), 3376–3391.
- Li, Y., Liu, Y., Li, J., Qin, W., Li, K., Yu, C., Jiang, T., 2009. Brain anatomical network and intelligence. *PLoS Comput. Biol.* 5, e1000395.
- Liang, X., Zou, Q., He, Y., Yang, Y., 2013. Coupling of functional connectivity and regional cerebral blood flow reveals a physiological basis for network hubs of the human brain. *Proc. Natl. Acad. Sci. U. S. A.* 110, 1929–1934.
- Lichtheim, L., 1885. On aphasia. *Brain* 7 (4), 433–484.
- Lichtman, J.W., Livet, J., Sanes, J.R., 2008. A technicolour approach to the connectome. *Nat. Rev. Neurosci.* 9 (6), 417–422.
- Lichtman, J.W., Denk, W., 2011. The big and the small: challenges of imaging the brain's circuits. *Science* 334, 618–623.
- Lichtman, J.W., Pfister, H., Shavit, N., 2014. The big data challenges of connectomics. *Nat. Neurosci.* 17, 1448–1454.
- Limpert, E., Stahel, W.A., Abbt, M., 2001. Log-normal distributions across the sciences: keys and clues. *Bioscience* 51, 341–352.
- Lindquist, M.A., Xu, Y., Nebel, M.B., Caffo, B.S., 2014. Evaluating dynamic bivariate correlations in resting-state functional MRI: a comparison study and a new approach. *NeuroImage* 101, 531–546.
- Linkenkaer-Hansen, K., Nikouline, V.V., Palva, J.M., Ilmoniemi, R.J., 2001. Long-range temporal correlations and scaling behavior in human brain oscillations. *J. Neurosci.* 21, 1370–1377.
- Lo, C.-Y.Z., Su, T.-W., Huang, C.-C., Hung, C.-C., Chen, W.-L., Lan, T.-H., Lin, C.-P., Bullmore, E.T., 2015. Randomization and resilience of brain functional networks as systems-level endophenotypes of schizophrenia. *Proc. Natl. Acad. Sci. U. S. A.* 112, 9123–9128.
- Logothetis, N.K., 2002. The neural basis of the blood-oxygen-level-dependent functional magnetic resonance imaging signal. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 357, 1003–1037.
- Logothetis, N.K., 2008. What we can do and what we cannot do with fMRI. *Nature* 453, 869–878.
- Logothetis, N.K., Pauls, J., Augath, M., Trinath, T., Oeltermann, A., 2001. Neurophysiological investigation of the basis of the fMRI signal. *Nature* 412, 150–157.
- Lohmann, G., Margulies, D.S., Horstmann, A., Pleger, B., Lepsién, J., Goldhahn, D., Schloegl, H., Stumvoll, M., Villringer, A., Turner, R., 2010. Eigenvector centrality mapping for analyzing connectivity patterns in fMRI data of the human brain. *PLoS One* 5, e10232.
- Lohse, C., Bassett, D.S., Lim, K.O., Carlson, J.M., 2014. Resolving anatomical and functional structure in human brain organization: identifying mesoscale organization in weighted network representations. *PLoS Comput. Biol.* 10 (10), e1003712.

- Lopes da Silva, F., 2013. EEG and MEG: relevance to neuroscience. *Neuron* 80, 1112–1128.
- López-Muñoz, F., Boya, J., Alamo, C., 2006. Neuron theory, the cornerstone of neuroscience, on the centenary of the Nobel Prize award to Santiago Ramón y Cajal. *Brain Res. Bull.* 70, 391–405.
- Luce, R.D., 1950. Connectivity and generalized cliques in sociometric group structure. *Psychometrika* 15, 169–190.
- Luce, R.D., Perry, A.D., 1949. A method of matrix analysis of group structure. *Psychometrika* 14, 95–116.
- Lütcke, H., Gerhard, F., Zenke, F., Gerstner, W., 2013. Inference of neuronal network spike dynamics and topology from calcium imaging data. *Front. Neural Circuits* 7, 201.
- Lynall, M.E., Bassett, D.S., Kerwin, R., McKenna, P.J., Kitzbichler, M., Muller, U., Bullmore, E., 2010. Functional connectivity and brain networks in schizophrenia. *J. Neurosci.* 30, 9477–9487.
- MacMahon, M., Garlaschelli, D., 2015. Community detection for correlation matrices. *Phys. Rev. X* 5, 021006–021034.
- MacQueen, J., 1967. Some methods for classification and analysis of multivariate observations. In: Proceedings of the Fifth Berkeley Symposium on Mathematical Statistics and Probability, vol. 1, pp. 281–297.
- Mantini, D., Perrucci, M.G., Del Gratta, C., Romani, G.L., Corbetta, M., 2007. Electrophysiological signatures of resting state networks in the human brain. *Proc. Natl. Acad. Sci. U. S. A.* 104, 13170–13175.
- Marder, E., 2015. Understanding brains: details, intuition, and big data. *PLoS Biol.* 13, e1002147.
- Marder, E., Goaillard, J.-M., 2006. Variability, compensation and homeostasis in neuron and network function. *Nat. Rev. Neurosci.* 7, 563–574.
- Margulies, D.S., Böttger, J., Watanabe, A., Gorgolewski, K.J., 2013. Visualizing the human connectome. *NeuroImage* 80, 445–461.
- Markov, N.T., Ercsey-Ravasz, M., Lamy, C., Ribeiro Gomes, A.R., Magrou, L., Misery, P., Giroud, P., Barone, P., Dehay, C., Toroczkai, Z., et al., 2013a. The role of long-range connections on the specificity of the macaque interareal cortical network. *Proc. Natl. Acad. Sci. U. S. A.* 110, 5187–5192.
- Markov, N.T., Ercsey-Ravasz, M., Van Essen, D.C., Knoblauch, K., Toroczkai, Z., Kennedy, H., 2013b. Cortical high-density counterstream architectures. *Science* 342, 1238406.
- Markov, N.T., Ercsey-Ravasz, M.M., Ribeiro Gomes, A.R., Lamy, C., Magrou, L., Vezoli, J., Misery, P., Falchier, A., Quilodran, R., Gariel, M.A., Sallet, J., Gamanut, R., Huissoud, C., Clavagnier, S., Giroud, P., Sapye-Marinier, D., Barone, P., Dehay, C., Toroczkai, Z., Knoblauch, K., Van Essen, D.C., Kennedy, H., 2014. A weighted and directed interareal connectivity matrix for macaque cerebral cortex. *Cereb. Cortex* 24 (1), 17–36.
- Markov, N.T., Vezoli, J., Chameau, P., Falchier, A., Quilodran, R., Huissoud, C., Lamy, C., Misery, P., Giroud, P., Ullman, S., et al., 2013c. Anatomy of hierarchy: feedforward and feedback pathways in macaque visual cortex. *J. Comp. Neurol.* 522, 225–259.
- Marrelec, G., Kim, J., Doyon, J., Horwitz, B., 2009. Large-scale neural model validation of partial correlation analysis for effective connectivity investigation in functional MRI. *Hum. Brain Mapp.* 30 (3), 941–950.
- Marrelec, G., Krainik, A., Duffau, H., Pélégrini-Issac, M., Lehéricy, S., Doyon, J., Benali, H., 2006. Partial correlation for functional brain interactivity investigation in functional MRI. *NeuroImage* 32, 228–237.
- Maslov, S., Sneppen, K., 2002. Specificity and stability in topology of protein networks. *Science* 296, 910–913.
- Mason, M.F., Norton, M.I., Van Horn, J.D., Wegner, D.M., Grafton, S.T., Macrae, C.N., 2007. Wandering minds: the default network and stimulus-independent thought. *Science* 315, 393–395.

- Maxim, V., Sendur, L., Fadili, J., Suckling, J., Gould, R., Howard, R., Bullmore, E., 2005. Fractional Gaussian noise, functional MRI and Alzheimer's disease. *NeuroImage* 25, 141–158.
- McIntosh, A.R., Bookstein, F.L., Haxby, J.V., Grady, C.L., 1996. Spatial pattern analysis of functional brain images using partial least squares. *NeuroImage* 3 (3 Pt 1), 143–157.
- Mechelli, A., Friston, K.J., Frackowiak, R.S., Price, C.J., 2005. Structural covariance in the human cortex. *J. Neurosci.* 25, 8303–8310.
- Meilă, M., 2007. Comparing clusterings—an information based distance. *J. Multivar. Anal.* 98, 873–895.
- Meskaldji, D.-E., Ottet, M.-C., Cammoun, L., Hagmann, P., Meuli, R., Eliez, S., Thiran, J.-P., Morgenthaler, S., 2011. Adaptive strategy for the statistical analysis of connectomes. *PLoS One* 6 (8), e23009.
- Meskaldji, D.-E., Vasung, L., Romascano, D., Thiran, J.P., Hagmann, P., Morgenthaler, S., Van De Ville, D., 2014. Improved statistical evaluation of group differences in connectomes by screening-filtering strategy with application to study maturation of brain connections between childhood and adolescence. *NeuroImage* 108, 251–264.
- Mesulam, M.M., 1990. Large-scale neurocognitive networks and distributed processing for attention, language, and memory. *Ann. Neurol.* 28, 597–613.
- Mesulam, M.M., 1998. From sensation to cognition. *Brain* 121, 1013–1052.
- Meunier, D., Achard, S., Morcom, A., Bullmore, E., 2009a. Age-related changes in modular organization of human brain functional networks. *NeuroImage* 44, 715–723.
- Meunier, D., Lambiotte, R., Bullmore, E.T., 2011. Modular and hierarchically modular organization of brain networks. *Front. Neurosci.* 4, 200.
- Meunier, D., Lambiotte, R., Fornito, A., Ersche, K.D., Bullmore, E.T., 2009b. Hierarchical modularity in human brain functional networks. *Front. Neuroinform.* 3, 37.
- Michel, C.M., Murray, M.M., Lantz, G., Gonzalez, S., 2004. EEG source imaging. *Clin. Neurophysiol.* 115, 195–222.
- Micheloyannis, S., Pachou, E., Stam, C.J., Breakspear, M., Bitsios, P., Vourkas, M., Erimaki, S., Zervakis, M., 2006a. Small-world networks and disturbed functional connectivity in schizophrenia. *Schizophr. Res.* 87, 60–66.
- Micheloyannis, S., Pachou, E., Stam, C.J., Vourkas, M., Erimaki, S., Tsirka, V., 2006b. Using graph theoretical analysis of multi channel EEG to evaluate the neural efficiency hypothesis. *Neurosci. Lett.* 402, 273–277.
- Milgram, S., 1967. The small world problem. *Psychol. Today* 2, 60–67.
- Miller, K.J., Sorensen, L.B., Ojemann, J.G., den Nijs, M., 2009. Power-law scaling in the brain surface electric potential. *PLoS Comput. Biol.* 5, e1000609.
- Milo, R., Kashtan, N., Itzkovitz, S., Newman, M.E.J., Alon, U., 2004. On the uniform generation of random graphs with prescribed degree sequences. *arXiv*, cond-mat/0312028v2.
- Milo, R., Shen-Orr, S., Itzkovitz, S., Kashtan, N., Chklovskii, D., Alon, U., 2002. Network motifs: simple building blocks of complex networks. *Science* 298, 824–827.
- Minzenberg, M.J., Laird, A.R., Thelen, S., Carter, C.S., Glahn, D.C., 2009. Meta-analysis of 41 functional neuroimaging studies of executive function in schizophrenia. *Arch. Gen. Psychiatry* 66, 811–822.
- Mišić, B., Betzel, R.F., Nematzadeh, A., Goñi, J., Griffa, A., Hagmann, P., Flammini, A., Ahn, Y.Y., Sporns, O., 2015. Cooperative and competitive spreading dynamics on the human connectome. *Neuron* 86 (6), 1518–1529.
- Mišić, B., Sporns, O., McIntosh, A.R., 2014. Communication efficiency and congestion of signal traffic in large-scale brain networks. *PLoS Comput. Biol.* 10 (1), e1003427.

- Mitchison, G., 1991. Neuronal branching patterns and the economy of cortical wiring. *Proc. Biol. Sci.* 245, 151–158.
- Mitra, P.P., 2014. The circuit architecture of whole brains at the mesoscopic scale. *Neuron* 83, 1273–1283.
- Mitzenmacher, M., 2004. A brief history of generative models for power law and lognormal distributions. *Internet Math.* 1, 226–251.
- Modha, D.S., Singh, R., 2010. Network architecture of the long-distance pathways in the macaque brain. *Proc. Natl. Acad. Sci. U. S. A.* 107, 13485–13490.
- Mohri, M., Rostamizadeh, A., Talwalkar, A., 2012. Foundations of Machine Learning. MIT Press, Cambridge, MA.
- Molloy, M., Reed, B., 1995. A critical point for random graphs with a given degree sequence. *Random Struct. Algoritm.* 6, 161–179.
- Moody, J., 2001. Race, school integration, and friendship segregation in America. *Am. J. Social.* 107, 679–716.
- Moreno-Dominguez, D., Anwander, A., Knösche, T.R., 2014. A hierarchical method for whole-brain connectivity-based parcellation. *Hum. Brain Mapp.* 35, 5000–5025.
- Morgan, J.L., Lichtman, J.W., 2013. Why not connectomics? *Nat. Rev. Neurosci.* 10, 494–500.
- Mori, S., Zhang, J., 2006. Principles of diffusion tensor imaging and its applications to basic neuroscience research. *Neuron* 51, 527–539.
- Mossa, S., Barthélémy, M., Eugene Stanley, H., Nunes Amaral, L.A., 2002. Truncation of power law behavior in “scale-free” network models due to information filtering. *Phys. Rev. Lett.* 88, 138701.
- Motter, A.E., de Moura, A.P., Lai, Y.C., Dasgupta, P., 2002. Topology of the conceptual network of language. *Phys. Rev. E* 65 (6), 065102.
- Mucha, P.J., Richardson, T., Macon, K., Porter, M.A., Onnela, J.-P., 2010. Community structure in time-dependent, multiscale, and multiplex networks. *Science* 328, 876–878.
- Muff, S., Rao, F., Caflisch, A., 2005. Local modularity measure for network clusterizations. *Phys. Rev. E* 72, 056107. 4.
- Nagasaka, Y., Shimoda, K., Fujii, N., 2011. Multidimensional recording (MDR) and data sharing: an ecological open research and educational platform for neuroscience. *PLoS One* 6, e22561–e22567.
- Nelson, S.M., Cohen, A.L., Power, J.D., Wig, G.S., Miezin, F.M., Wheeler, M.E., Velanova, K., Donaldson, D.I., Phillips, J.S., Schlaggar, B.L., et al., 2010. A parcellation scheme for human left lateral parietal cortex. *Neuron* 67, 156–170.
- Nepusz, T., Négyessy, L., Bazsó, F., 2008. Fuzzy communities and the concept of bridgeness in complex networks. *Phys. Rev. E* 77, 016107.
- Newman, M.E.J., 2002. Assortative mixing in networks. *Phys. Rev. Lett.* 89, 208701–208704.
- Newman, M.E.J., 2003a. The structure and function of complex networks. *SIAM Rev.* 45 (2), 167–256.
- Newman, M.E.J., 2003b. Mixing patterns in networks. *Phys. Rev. E* 67, 026126. 13.
- Newman, M.E.J., 2004a. Analysis of weighted networks. *Phys. Rev. E* 70, 056131.
- Newman, M.E.J., 2004b. Coauthorship networks and patterns of scientific collaboration. *Proc. Natl. Acad. Sci. U. S. A.* 101 (Suppl. 1), 5200–5205.
- Newman, M.E.J., 2004c. Fast algorithm for detecting community structure in networks. *Phys. Rev. E* 69, 066133.
- Newman, M.E.J., 2005a. Power laws, Pareto distributions and Zipf’s law. *Contemp. Phys.* 46, 323–351.

- Newman, M.E.J., 2005b. A measure of betweenness centrality based on random walks. *Soc. Networks* 27, 39–54.
- Newman, M.E.J., 2006. Modularity and community structure in networks. *Proc. Natl. Acad. Sci. U. S. A.* 103, 8577–8582.
- Newman, M.E.J., 2009. Random graphs with clustering. *Phys. Rev. Lett.* 103, 05870.
- Newman, M.E.J., 2010. Networks. An Introduction. Oxford University Press, Oxford.
- Newman, M.E.J., 2013. Spectral methods for community detection and graph partitioning. *Phys. Rev. E* 88, 042822.
- Newman, M.E.J., Girvan, M., 2004. Finding and evaluating community structure in networks. *Phys. Rev. E* 69, 026113.
- Newman, M.E.J., Strogatz, S.H., Watts, D.J., 2001. Random graphs with arbitrary degree distributions and their applications. *Phys. Rev. E* 64, 026118.
- Nichols, T.E., Holmes, A.P., 2001. Nonparametric permutation tests for functional neuroimaging: a primer with examples. *Hum. Brain Mapp.* 15, 1–25.
- Nichols, T., Hayasaka, S., 2003. Controlling the familywise error rate in functional neuroimaging: a comparative review. *Stat. Methods Med. Res.* 12 (5), 419–446.
- Nicosia, V., Mangioni, G., Carchiolo, V., 2009. Extending the definition of modularity to directed graphs with overlapping communities. *J. Stat. Mech. Theory Exp.* P03024.
- Nicosia, V., Vértes, P.E., Schafer, W.R., Latora, V., Bullmore, E.T., 2013. Phase transition in the economically modeled growth of a cellular nervous system. *Proc. Natl. Acad. Sci.* 110 (19), 7880–7885.
- Nieuwenhuys, R., 2013. The myeloarchitectonic studies on the human cerebral cortex of the Vogt-Vogt School, and their significance for the interpretation of functional neuroimaging data. *Brain Struct. Funct.* 218, 303–352.
- Niven, J.E., Laughlin, S.B., 2008. Energy limitation as a selective pressure on the evolution of sensory systems. *J. Exp. Biol.* 211 (11), 1792–1804.
- Noppeney, U., Friston, K.J., Price, C.J., 2004. Degenerate neuronal systems sustaining cognitive functions. *J. Anat.* 205, 433–442.
- Norman, K.A., Polyn, S.M., Detre, G.J., Haxby, J.V., 2006. Beyond mind-reading: multi-voxel pattern analysis of fMRI data. *Trends Cogn. Sci.* 10 (9), 424–430.
- Nunez, P.L., Srinivasan, R., 2006. Electrical Fields of the Brain. Oxford University Press, New York, NY.
- O'Shea, J., Johansen-Berg, H., Trief, D., Gobel, S., Rushworth, M.F., 2007. Functionally specific reorganization in human premotor cortex. *Neuron* 54, 479–490.
- Oh, S.W., Harris, J.A., Ng, L., Winslow, B., Cain, N., Mihalas, S., Wang, Q., Lau, C., Kuan, L., Henry, A.M., Mortrud, M.T., Ouellette, B., Nguyen, T.N., Sorensen, S.A., Slaughterbeck, C.R., Wakeman, W., Li, Y., Feng, D., Ho, A., Nicholas, E., Hirokawa, K.E., Bohn, P., Joines, K.M., Peng, H., Hawrylycz, M.J., Phillips, J.W., Hohmann, J.G., Wohnoutka, P., Gerfen, C.R., Koch, C., Bernard, A., Dang, C., Jones, A.R., Zeng, H., 2014. A mesoscale connectome of the mouse brain. *Nature* 508 (7495), 207–214.
- Oláh, S., Füle, M., Komlósi, G., Varga, C., Báldi, R., Barzó, P., Tamás, G., 2009. Regulation of cortical microcircuits by unitary GABA-mediated volume transmission. *Nature* 461, 1278–1281.
- Oldham, M.C., Konopka, G., Iwamoto, K., Langfelder, P., Kato, T., Horvath, S., Geschwind, D.H., 2008. Functional organization of the transcriptome in human brain. *Nat. Neurosci.* 11 (11), 1271–1282.
- Olshausen, B.A., Field, D.J., 2004. Sparse coding of sensory inputs. *Curr. Opin. Neurobiol.* 14 (4), 481–487.

- Onnela, J.-P., Saramäki, J., Kertész, J., Kaski, K., 2005. Intensity and coherence of motifs in weighted complex networks. *Phys. Rev. E* 71, 065103.
- Opsahl, T., Agneessens, F., Skvoretz, J., 2010. Node centrality in weighted networks: generalizing degree and shortest paths. *Soc. Networks* 32, 245–251.
- Opsahl, T., Colizza, V., Panzarasa, P., Ramasco, J., 2008. Prominence and control: the weighted rich-club effect. *Phys. Rev. Lett.* 101, 168702.
- Orden, A., 1956. The transshipment problem. *Manag. Sci.* 2 (3), 276–285.
- Osten, P., Margrie, T.W., 2013. Mapping brain circuitry with a light microscope. *Nat. Methods* 10, 515–523.
- Ostojic, S., Brunel, N., Hakim, V., 2009. How connectivity, background activity, and synaptic properties shape the cross-correlation between spike trains. *J. Neurosci.* 29, 10234–10253.
- Ozaktas, H.M., 1992. Paradigms of connectivity for computer circuits and networks. *Opt. Eng.* 31, 1563–1567.
- O'Reilly, R.C., 2006. Biologically based computational models of high-level cognition. *Science* 314, 91–94.
- Palla, G., Barabási, A.-L., Vicsek, T., 2007. Quantifying social group evolution. *Nature* 446, 664–667.
- Palla, G., Derenyi, I., Farkas, I., Vicsek, T., 2005. Uncovering the overlapping community structure of complex networks in nature and society. *Nature* 435, 814–818.
- Palva, J.M., Monto, S., Kulashekhar, S., Palva, S., 2010. Neuronal synchrony reveals working memory networks and predicts individual memory capacity. *Proc. Natl. Acad. Sci.* 107 (16), 7580–7585.
- Pannese, E., 1999. The Golgi stain: invention, diffusion and impact on neurosciences. *J. Hist. Neurosci.* 8, 132–140.
- Passingham, R.E., Stephan, K.E., Kotter, R., 2002. The anatomical basis of functional localization in the cortex. *Nat. Rev. Neurosci.* 3, 606–616.
- Patel, A.X., Bullmore, E.T., 2016. A wavelet-based estimator of the degrees of freedom in denoised fMRI time series for probabilistic testing of functional connectivity and brain graphs. *NeuroImage*. <http://dx.doi.org/10.1016/j.neuroimage.2015.04.052>.
- Patel, A.X., Kundu, P., Rubinov, M., Jones, P.S., Vértes, P.E., Ersche, K.D., Suckling, J., Bullmore, E.T., 2014. A wavelet method for modeling and despiking motion artifacts from resting-state fMRI time series. *NeuroImage* 95, 287–304.
- Paus, T., Keshavan, M., Giedd, J.N., 2008. Why do many psychiatric disorders emerge during adolescence? *Nat. Rev. Neurosci.* 9, 947–957.
- Pavlovic, D.M., Vértes, P.E., Bullmore, E.T., Schafer, W.R., Nichols, T.E., 2014. Stochastic block-modeling of the modules and core of the *Caenorhabditis elegans* connectome. *PLoS One* 9, e97584. 16.
- Peasarin, F., 2002. Multivariate Permutation Tests: With Applications in Biostatistics. Wiley, New York, NY.
- Peixoto, T.P., Bornholdt, S., 2012. Evolution of robust network topologies: emergence of central backbones. *Phys. Rev. Lett.* 109, 118703.
- Penfield, W., Jasper, H., 1954. Epilepsy and the Functional Anatomy of the Human Brain. Little, Brown and Company, Boston, MA.
- Petermann, T., Thiagarajan, T.C., Lebedev, M.A., Nicolelis, M.A.L., Chialvo, D.R., Plenz, D., 2009. Spontaneous cortical activity in awake monkeys composed of neuronal avalanches. *Proc. Natl. Acad. Sci. U. S. A.* 106, 15921–15926.
- Pitman, E.J.G., 1937. Significance tests which may be applied to samples from any population. *Suppl. J. R. Stat. Soc.* 4, 119–130. 225–232 (parts I & II).

- Plaza, S.M., Scheffer, L.K., Chklovskii, D.B., 2014. Toward large-scale connectome reconstructions. *Curr. Opin. Neurobiol.* 25, 201–210.
- Plis, S.M., Hjelm, D.R., Salakhutdinov, R., Allen, E.A., Bockholt, H.J., Long, J.D., Johnson, H.J., Paulsen, J.S., Turner, J.A., Calhoun, V.D., 2014. Deep learning for neuroimaging: a validation study. *Front. Neurosci.* 8, 229.
- Power, J.D., Barnes, K.A., Snyder, A.Z., Schlaggar, B.L., Petersen, S.E., 2012. Spurious but systematic correlations in functional connectivity MRI networks arise from subject motion. *NeuroImage* 59, 2142–2154.
- Power, J.D., Cohen, A.L., Nelson, S.M., Wig, G.S., Barnes, K.A., Church, J.A., Vogel, A.C., Laumann, T.O., Miezin, F.M., Schlaggar, B.L., et al., 2011. Functional network organization of the human brain. *Neuron* 72, 665–678.
- Power, J.D., Schlaggar, B.L., Lessov-Schlaggar, C.N., Petersen, S.E., 2013. Evidence for hubs in human functional brain networks. *Neuron* 79, 798–813.
- Prichard, D., Theiler, J., 1994. Generating surrogate data for time series with several simultaneously measured variables. *Phys. Rev. Lett.* 73, 951–954.
- Priester, C., Schmitt, S., Peixoto, T.P., 2014. Limits and trade-offs of topological network robustness. *PLoS One* 9, e108215–e108219.
- Rademacher, J., Bürgel, U., Zilles, K., 2002. Stereotaxic localization, intersubject variability, and interhemispheric differences of the human auditory thalamocortical system. *NeuroImage* 17, 142–160.
- Rademacher, J., Caviness Jr., V.S., Steinmetz, H., Galaburda, A.M., 1993. Topographical variation of the human primary cortices: implications for neuroimaging, brain mapping, and neurobiology. *Cereb. Cortex* 3, 313–329.
- Raichle, M.E., MacLeod, A.M., Snyder, A.Z., Powers, W.J., Gusnard, D.A., Shulman, G.L., 2001. A default mode of brain function. *Proc. Natl. Acad. Sci. U. S. A.* 98, 676–682.
- Raj, A., Chen, Y.H., 2011. The wiring economy principle: connectivity determines anatomy in the human brain. *PLoS One* 6, e14832.
- Raj, A., Kuceyeski, A., Weiner, M., 2012. A network diffusion model of disease progression in dementia. *Neuron* 73, 1204–1215.
- Rajah, M.N., 2005. Region-specific changes in prefrontal function with age: a review of PET and fMRI studies on working and episodic memory. *Brain* 128, 1964–1983.
- Ramón y Cajal, S., 1995. *Histology of the Nervous System* (N. Swanson, L.W. Swanson, Trans.). Oxford University Press, New York, NY.
- Rand, W.M., 1971. Objective criteria for the evaluation of clustering methods. *J. Am. Stat. Assoc.* 66, 846–850.
- Ravasz, E., Barabási, A.L., 2003. Hierarchical organization in complex networks. *Phys. Rev. E* 67, 026112.
- Rehme, A.K., Eickhoff, S.B., Rottschy, C., Fink, G.R., Grefkes, C., 2012. Activation likelihood estimation meta-analysis of motor-related neural activity after stroke. *NeuroImage* 59, 2771–2782.
- Reichardt, J., Bornholdt, S., 2006. Statistical mechanics of community detection. *Phys. Rev. E* 74, 016110.
- Reveley, C., Seth, A.K., Pierpaoli, C., Silva, A.C., Yu, D., Saunders, R.C., Leopold, D.A., Ye, F.Q., 2015. Superficial white matter fiber systems impede detection of long-range cortical connections in diffusion MR tractography. *Proc. Natl. Acad. Sci. U. S. A.* 112, E2820–E2828.
- Ringo, J.L., 1991. Neuronal interconnection as a function of brain size. *Brain Behav. Evol.* 38, 1–6.
- Riva-Posse, P., Choi, K.S., Holtzheimer, P.E., McIntyre, C.C., Gross, R.E., Chaturvedi, A., Crowell, A.L., Garlow, S.J., Rajendra, J.K., Mayberg, H.S., 2014. Defining critical white matter

- pathways mediating successful subcallosal cingulate deep brain stimulation for treatment-resistant depression. *Biol. Psychiatry* 76, 963–969.
- Rivera-Alba, M., Vitaladevuni, S.N., Mishchenko, Y., Lu, Z., Takemura, S.-Y., Scheffer, L., Meinertzhagen, I.A., Chklovskii, D.B., de Polavieja, G.G., 2011. Wiring economy and volume exclusion determine neuronal placement in the *Drosophila* brain. *Curr. Biol.* 21, 2000–2005.
- Roberts, J.A., Perry, A., Lord, A.R., Roberts, G., Mitchell, P.B., Smith, R.E., Calamante, F., Breakspear, M., 2016. The contribution of geometry to the human connectome. *NeuroImage* 124, 379–393.
- Robins, G., Pattison, P., Kalish, Y., Lusher, D., 2007. An introduction to exponential random graph (p^*) models for social networks. *Soc. Networks* 29 (2), 173–191.
- Robinson, P., Henderson, J., Matar, E., Riley, P., Gray, R., 2009. Dynamical reconnection and stability constraints on cortical network architecture. *Phys. Rev. Lett.* 103, 108104.
- Rocca, J., 1997. Galen and the ventricular system. *J. Hist. Neurosci.* 6, 227–239.
- Rochat, Y., 2009. Closeness centrality extended to unconnected graphs: the harmonic centrality index. In: Applications of Social Network Analysis.
- Roelfsema, P.R., Engel, A.K., König, P., Singer, W., 1997. Visuomotor integration is associated with zero time-lag synchronization among cortical areas. *Nature* 385, 157–161.
- Rombach, M.P., Porter, M.A., Fowler, J.H., Mucha, P.J., 2014. Core-periphery structure in networks. *SIAM J. Appl. Math.* 74, 167–190.
- Rose, F.C., 2009. Cerebral localization in antiquity. *J. Hist. Neurosci.* 18, 239–247.
- Ross, D.T., Ebner, F.F., 1990. Thalamic retrograde degeneration following cortical injury: an excitotoxic process? *Neuroscience* 35, 525–550.
- Rossa, F.D., Dercole, F., Piccardi, C., 2013. Profiling core-periphery network structure by random walkers. *Sci. Rep.* 3, 1–8.
- Rosvall, M., Bergstrom, C.T., 2008. Maps of random walks on complex networks reveal community structure. *Proc. Natl. Acad. Sci. U. S. A.* 105, 1118–1123.
- Rubinov, M., Sporns, O., 2011. Weight-conserving characterization of complex functional brain networks. *NeuroImage* 56, 2068–2079.
- Rubinov, M., Sporns, O., 2010. Complex network measures of brain connectivity: uses and interpretations. *NeuroImage* 80, 426–444.
- Rubinov, M., Knock, S.A., Stam, C.J., Micheloyannis, S., Harris, A.W., Williams, L.M., Breakspear, M., 2009. Small-world properties of nonlinear brain activity in schizophrenia. *Hum. Brain Mapp.* 30 (2), 403–416.
- Rubinov, M., Sporns, O., Thivierge, J.P., Breakspear, M., 2011. Neurobiologically realistic determinants of self-organized criticality in networks of spiking neurons. *PLoS Comput. Biol.* 7, e1002038.
- Rubinov, M., Ypma, R.J.F., Watson, C., Bullmore, E.T., 2015. Wiring cost and topological participation of the mouse brain connectome. *Proc. Natl. Acad. Sci. U. S. A.* 112, 10032–10037.
- Rumelhart, D.E., McLelland, J.L., The PDP Research Group, 1986. Parallel Distributed Processing: Explorations in the Microstructure of Cognition. Foundations, vol. 1. MIT Press, Cambridge, MA.
- Sadovsky, A.J., MacLean, J.N., 2013. Scaling of topologically similar functional modules defines mouse primary auditory and somatosensory microcircuitry. *J. Neurosci.* 33, 14048–14060.
- Sadovsky, A.J., MacLean, J.N., 2014. Mouse visual neocortex supports multiple stereotyped patterns of microcircuit activity. *J. Neurosci.* 34, 7769–7777.
- Sales-Pardo, M., Guimerà, R., Moreira, A.A., Amaral, L.A.N., 2007. Extracting the hierarchical organization of complex systems. *Proc. Natl. Acad. Sci. U. S. A.* 104, 15224–15229.

- Salton, G., 1989. Automatic Text Processing: The Transformation, Analysis and Retrieval of Information by Computer. Addison-Wesley, Reading, MA.
- Salvador, R., Martinez, A., Pomarol-Clotet, E., Sarro, S., Suckling, J., Bullmore, E., 2007. Frequency based mutual information measures between clusters of brain regions in functional magnetic resonance imaging. *NeuroImage* 35, 83–88.
- Salvador, R., Suckling, J., Coleman, M.R., Pickard, J.D., Menon, D., Bullmore, E., 2005. Neurophysiological architecture of functional magnetic resonance images of human brain. *Cereb. Cortex* 15, 1332–1342.
- Samu, D., Seth, A.K., Nowotny, T., 2014. Influence of wiring cost on the large-scale architecture of human cortical connectivity. *PLoS Comput. Biol.* 10, e1003557. 24.
- Saramäki, J., Kivelä, M., Onnela, J.-P., Kaski, K., Kertész, J., 2007. Generalizations of the clustering coefficient to weighted complex networks. *Phys. Rev. E* 75, 027105. 4.
- Satterthwaite, T.D., Elliott, M.A., Gerraty, R.T., Ruparel, K., Loughead, J., Calkins, M.E., Eickhoff, S.B., Hakonarson, H., Gur, R.C., Gur, R.E., et al., 2013. An improved framework for confound regression and filtering for control of motion artifact in the preprocessing of resting-state functional connectivity data. *NeuroImage* 64, 240–256.
- Scannell, J.W., 1997. Determining cortical landscapes. *Nature* 386, 452.
- Schaeffer, S.E., 2007. Graph clustering. *Comput. Sci. Rev.* 1, 27–64.
- Schleicher, A., Amunts, K., Geyer, S., Morosan, P., Zilles, K., 1999. Observer-independent method for microstructural parcellation of cerebral cortex: a quantitative approach to cytoarchitectonics. *NeuroImage* 9, 165–177.
- Scholkmann, F., Kleiser, S., Metz, A.J., Zimmermann, R., Mata Pavia, J., Wolf, U., Wolf, M., 2014. A review on continuous wave functional near-infrared spectroscopy and imaging instrumentation and methodology. *NeuroImage* 85 (Pt 1), 6–27.
- Scholtens, L.H., Schmidt, R., de Reus, M.A., van den Heuvel, M.P., 2014. Linking macroscale graph analytical organization to microscale neuroarchitectonics in the macaque connectome. *J. Neurosci.* 34 (36), 12192–12205.
- Scholvinck, M.L., Friston, K.J., Rees, G., 2011. The influence of spontaneous activity on stimulus processing in primary visual cortex. *NeuroImage* 80, 297–306.
- Schomer, D.L., da Silva, F.H., 2005. Niedermeyer's Electroencephalography: Basic Principles, Clinical Applications, and Related Fields. Lippincott Williams & Wilkins, Philadelphia, PA.
- Schriever, T., Schmitz, A., 2000. Surrogate time series. *Physica D* 142, 346–382.
- Schrijver, A., 2012. On the history of the shortest path problem. *Doc. Math. Optimization Stories* 155–167.
- Schrödel, T., Prevedel, R., Aumayr, K., Zimmer, M., Vaziri, A., 2013. Brain-wide 3D imaging of neuronal activity in *Caenorhabditis elegans* with sculpted light. *Nat. Methods* 10, 1013–1020.
- Schroeter, M.S., Charlesworth, P., Kitzbichler, M.G., Paulsen, O., Bullmore, E.T., 2015. Emergence of rich-club topology and coordinated dynamics in development of hippocampal functional networks in vitro. *J. Neurosci.* 35, 5459–5470.
- Scoville, W.B., Milner, B., 1957. Loss of recent memory after bilateral hippocampal lesions. *J. Neurol. Neurosurg. Psychiatry* 20, 11–21.
- Seehaus, A.K., Roebroeck, A., Chiry, O., Kim, D.S., Ronen, I., Bratzke, H., Goebel, R., Galuske, R.A.W., 2013. Histological validation of DW-MRI tractography in human postmortem tissue. *Cereb. Cortex* 23, 442–450.
- Seeley, W.W., Crawford, R.K., Zhou, J., Miller, B.L., Greicius, M.D., 2009. Neurodegenerative diseases target large-scale human brain networks. *Neuron* 62, 42–52.
- Seghier, M.L., Friston, K.J., 2013. Network discovery with large DCMs. *NeuroImage* 68, 181–191.

- Seghier, M.L., Lee, H.L., Schofield, T., Ellis, C.L., Price, C.J., 2008. Inter-subject variability in the use of two different neuronal networks for reading aloud familiar words. *NeuroImage* 42, 1226–1236.
- Seidman, S.B., 1983. Network structure and minimum degree. *Soc. Networks* 5, 269–287.
- Sejnowski, T.J., Churchland, P.S., Movshon, J.A., 2014. Putting big data to good use in neuroscience. *Nat. Neurosci.* 17, 1440–1441.
- Serrano, M.A., Boguñá, M., Vespignani, A., 2009. Extracting the multiscale backbone of complex weighted networks. *Proc. Natl. Acad. Sci. U. S. A.* 106 (16), 6483–6488.
- Serrano, M.A., Boguñá, M., Pastor-Satorras, R., 2006. Correlations in weighted networks. *Phys. Rev. E* 74, 055101.
- Shallice, T., 1988. From Neuropsychology to Mental Structure. Cambridge University Press, New York, NY.
- Shanahan, M., 2010. Metastable chimera states in community-structured oscillator networks. *Chaos* 20, 013108.
- Shanahan, M., Wildie, M., 2012. Knotty-centrality: finding the connective core of a complex network. *PLoS One* 7, e36579.
- Shanahan, M., Bingman, V.P., Shimizu, T., Wild, M., Guntukun, O., 2013. Large-scale network organization in the avian forebrain: a connectivity matrix and theoretical analysis. *Front. Comput. Neurosci.* 7, 1–17.
- Sharir, M., 1981. A strong connectivity algorithm and its applications to data flow analysis. *Comput. Math. Appl.* 7, 67–72.
- Shehzad, Z., Kelly, C., Reiss, P.T., Craddock, C.R., Emerson, J.W., McMahon, K., Copland, D.A., Castellanos, F.X., Milham, M.P., 2014. A multivariate distance-based analytic framework for connectome-wide association studies. *NeuroImage* 93 (Pt 1), 74–94.
- Shen-Orr, S.S., Milo, R., Mangan, S., Alon, U., 2002. Network motifs in the transcriptional regulation network of *Escherichia coli*. *Nat. Genet.* 31, 64–68.
- Shen, H.W., Cheng, X.Q., Guo, J.F., 2009. Quantifying and identifying the overlapping community structure in networks. *J. Stat. Mech. Theory Exp.* 2009, P07042.
- Sherbondy, A.J., Rowe, M., Alexander, D., 2010. MicroTrack: an algorithm for concurrent projectome and microstructure estimation. *MICCAI* 13, 183–190.
- Shi, J., Malik, J., 2000. Normalized cuts and image segmentation. *IEEE Trans. Pattern Anal. Mach. Intell.* 22 (8), 888–905.
- Shih, C.-T., Sporns, O., Yuan, S.-L., Su, T.-S., Lin, Y.-J., Chuang, C.-C., Wang, T.-Y., Lo, C.-C., Greenspan, R.J., Chiang, A.-S., 2015. Connectomics-based analysis of information flow in the *Drosophila* brain. *Curr. Biol.* 25, 1249–1258.
- Shimbai, A., 1953. Structural parameters of communication networks. *Bull. Math. Biophys.* 15, 501–507.
- Shoval, O., Alon, U., 2010. SnapShot: network motifs. *Cell* 143, 326–326.e1.
- Shulman, G.L., Fiez, J.A., Corbetta, M., Buckner, R.L., Miezin, F.M., Raichle, M.E., Petersen, S.E., 1997. Common blood flow changes across visual tasks: II. Decreases in cerebral cortex. *J. Cogn. Neurosci.* 9, 648–663.
- Sidak, Z.K., 1967. Rectangular confidence regions for the means of multivariate normal distributions. *J. Am. Stat. Assoc.* 62 (318), 626–633.
- Siegel, M., Donner, T.H., Engel, A.K., 2012. Spectral fingerprints of large-scale neuronal interactions. *Nat. Rev. Neurosci.* 13, 121–134.
- Silver, R.A., 2010. Neuronal arithmetic. *Nat. Rev. Neurosci.* 11, 474–489.
- Simes, R.J., 1986. An improved Bonferroni procedure for multiple tests of significance. *Biometrika* 73 (3), 751–754.
- Simon, H.A., 1955. On a class of skew distribution functions. *Biometrika* 42, 425.

- Simon, H.A., 1962. The architecture of complexity. *Proc. Am. Philos. Soc.* 106, 467–482.
- Simons, J.S., Henson, R.N., Gilbert, S.J., Fletcher, P.C., 2008. Separable forms of reality monitoring supported by anterior prefrontal cortex. *J. Cogn. Neurosci.* 20, 447–457.
- Simpson, S.L., Bowman, F.D., Laurienti, P.J., 2013. Analyzing complex functional brain networks: fusing statistics and network science to understand the brain. *Stat. Surv.* 7, 1–36.
- Simpson, S.L., Moussa, M.N., Laurienti, P.J., 2012. An exponential random graph modeling approach to creating group-based representative whole-brain connectivity networks. *NeuroImage* 60 (2), 1117–1126.
- Singer, W., 1999. Neuronal synchrony: a versatile code for the definition of relations? *Neuron* 24, 49–65. 111–125.
- Singer, W., 2013. Cortical dynamics revisited. *Trends Cogn. Sci.* 17, 616–626.
- Singer, W., Gray, C.M., 1995. Visual feature integration and the temporal correlation hypothesis. *Annu. Rev. Neurosci.* 18, 555–586.
- Skudlarski, P., Jagannathan, K., Anderson, K., Stevens, M.C., Calhoun, V.D., Skudlarska, B.A., Pearlson, G., 2010. Brain connectivity is not only lower but different in schizophrenia: a combined anatomical and functional approach. *Biol. Psychiatry* 68, 61–69.
- Skudlarski, P., Jagannathan, K., Calhoun, V.D., Hampson, M., Skudlarska, B.A., Pearlson, G., 2008. Measuring brain connectivity: diffusion tensor imaging validates resting state temporal correlations. *NeuroImage* 43, 554–561.
- Smilkov, D., Kocarev, L., 2010. Rich-club and page-club coefficients for directed graphs. *Physica A* 389, 2290–2299.
- Smit, D.J., Stam, C.J., Posthuma, D., Boomsma, D.I., de Geus, E.J., 2008. Heritability of “small-world” networks in the brain: a graph theoretical analysis of resting-state EEG functional connectivity. *Hum. Brain Mapp.* 29, 1368–1378.
- Smith, S.M., Fox, P.T., Miller, K.L., Glahn, D.C., Fox, P.M., Mackay, C.E., Filippini, N., Watkins, K.E., Toro, R., Laird, A.R., et al., 2009. Correspondence of the brain’s functional architecture during activation and rest. *Proc. Natl. Acad. Sci. U. S. A.* 106, 13040–13045.
- Smith, R.E., Tournier, J.-D., Calamante, F., Connelly, A., 2013. SIFT: spherical-deconvolution informed filtering of tractograms. *NeuroImage* 67, 298–312.
- Smith, S.M., Miller, K.L., Moeller, S., Xu, J., Auerbach, E.J., Woolrich, M.W., Beckmann, C.F., Jenkinson, M., Andersson, J., et al., 2012. Temporally-independent functional modes of spontaneous brain activity. *Proc. Natl. Acad. Sci. U. S. A.* 109, 3131–3136.
- Smith, S.M., Miller, K.L., Salimi-Khorshidi, G., Webster, M., Beckmann, C.F., Nichols, T.E., Ramsey, J.D., Woolrich, M.W., 2011. Network modelling methods for fMRI. *NeuroImage* 54, 875–891.
- Smith, R.E., Tournier, J.D., Calamante, F., Connelly, A., 2015. Enabling dense quantitative assessment of brain white matter connectivity using streamlines tractography. *NeuroImage* 119, 338–351.
- Smith, S.M., Nichols, T.E., Vidaurre, D., Winkler, A.M., Behrens, T.E., Glasser, M.F., Ugurbil, K., Barch, D.M., Van Essen, D.C., Miller, K.L., 2015. A positive-negative mode of population covariation links brain connectivity, demographics and behavior. *Nat Neurosci.* 18 (11), 1565–1567.
- Sneppen, K., Trusina, A., Rosvall, M., 2005. Hide-and-seek on complex networks. *Europhys. Lett.* 69 (5), 853–859.
- Snijders, T.A.B., Nowicki, K., 1997. Estimation and prediction for stochastic blockmodels for graphs with latent block structure. *J. Classif.* 14, 75–100.
- Song, H.F., Kennedy, H., Wang, X.-J., 2014. Spatial embedding of structural similarity in the cerebral cortex. *Proc. Natl. Acad. Sci. U. S. A.* 111, 16580–16585.
- Song, S., Abbott, L.F., 2001. Cortical development and remapping through spike timing-dependent plasticity. *Neuron* 32, 339–350.

- Sonuga-Barke, E.J.S., Castellanos, F.X., 2007. Spontaneous attentional fluctuations in impaired states and pathological conditions: a neurobiological hypothesis. *Neurosci. Biobehav. Rev.* 31, 977–986.
- Sporns, O., 2006. Small-world connectivity, motif composition, and complexity of fractal neuronal connections. *BioSystems* 85, 55–64.
- Sporns, O., 2011a. Networks of the Brain. MIT Press, Cambridge, MA.
- Sporns, O., 2011b. The non-random brain: efficiency, economy, and complex dynamics. *Front. Comput. Neurosci.* 5, 5.
- Sporns, O., 2012. Discovering the Human Connectome. MIT Press, Cambridge, MA.
- Sporns, O., Kötter, R., 2004. Motifs in brain networks. *PLoS Biol.* 2, e369.
- Sporns, O., Zwi, J.D., 2004. The small world of the cerebral cortex. *Neuroinformatics* 2, 145–162.
- Sporns, O., Chialvo, D.R., Kaiser, M., Hilgetag, C.C., 2004. Organization, development and function of complex brain networks. *Trends Cogn. Sci.* 8 (9), 418–425.
- Sporns, O., Honey, C.J., Kötter, R., 2007. Identification and classification of hubs in brain networks. *PLoS One* 2, e1049.
- Sporns, O., Tononi, G., Edelman, G.M., 2000. Theoretical neuroanatomy: relating anatomical and functional connectivity in graphs and cortical connection matrices. *Cereb. Cortex* 10, 127–141.
- Sporns, O., Tononi, G., Kötter, R., 2005. The human connectome: a structural description of the human brain. *PLoS Comput. Biol.* 1, e42.
- Stam, C.J., 2014. Modern network science of neurological disorders. *Nat. Rev. Neurosci.* 15 (10), 683–695.
- Stam, C.J., 2004. Functional connectivity patterns of human magnetoencephalographic recordings: a “small-world” network? *Neurosci. Lett.* 355, 25–28.
- Stam, C.J., van Dijk, B.W., 2002. Synchronization likelihood: an unbiased measure of generalized synchronization in multivariate data sets. *Physica D* 163, 236–251.
- Stam, C.J., Jones, B.F., Nolte, G., Breakspear, M., Scheltens, P., 2007. Small-world networks and functional connectivity in Alzheimer’s disease. *Cereb. Cortex* 17, 92–99.
- Stam, C.J., Tewarie, P., van Dellen, E., van Straaten, E.C.W., Hillebrand, A., van Mieghem, P., 2014. The trees and the forest: characterization of complex brain networks with minimum spanning trees. *Int. J. Psychophysiol.* 92, 129–138.
- Stephan, K.E., Kamper, L., Bozkurt, A., Burns, G.A., Young, M.P., Kötter, R., 2001. Advanced database methodology for the collation of connectivity data on the macaque brain (CoCoMac). *Philos. Trans. R. Soc. Lond. B* 356 (1412), 1159–1186.
- Stephan, K.E., 2013. The history of CoCoMac. *NeuroImage* 80, 46–52.
- Stephan, K.E., Kötter, R., 1999. One cortex—many maps: an introduction to coordinate-independent mapping by objective relational transformation (ORT). *Neurocomputing* 26–27, 1049–1054.
- Stephan, K.E., Kasper, L., Harrison, L.M., Daunizeau, J., den Ouden, H.E., Breakspear, M., Friston, K.J., 2008. Nonlinear dynamic causal models for fMRI. *NeuroImage* 42, 649–662.
- Stephan, K.E., Zilles, K., Kötter, R., 2000. Coordinate-independent mapping of structural and functional data by objective relational transformation (ORT). *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 355, 37–54.
- Stettler, D.D., Yamahachi, H., Li, W., Denk, W., Gilbert, C.D., 2006. Axons and synaptic boutons are highly dynamic in adult visual cortex. *Neuron* 49, 877–887.
- Stojmenovic, I., 2002. Position based routing in ad hoc networks. *IEEE Commun. Mag.* 40 (7), 128–134.

- Storey, J.D., 2002. A direct approach to false discovery rates. *J. R. Stat. Soc. Ser. B* 64 (3), 479–498.
- Strong, S.P., Koberle, R., de Ruyter van Steveninck, R.R., Bialek, W., 1998. Entropy and neural spike trains. *Phys. Rev. Lett.* 80, 197.
- Supper, J., Spangenberg, L., Planatscher, H., Dräger, A., Schröder, A., Zell, A., 2009. BowTieBuilder: modeling signal transduction pathways. *BMC Syst. Biol.* 3, 67.
- Takemura, S.-Y., Bharioke, A., Lu, Z., Nern, A., Vitaladevuni, S., Rivlin, P.K., Katz, W.T., Olbris, D.J., Plaza, S.M., Winston, P., et al., 2013. A visual motion detection circuit suggested by *Drosophila* connectomics. *Nature* 500, 175–181.
- Telesford, Q., Simpson, S.L., Burdette, J.H., Hayasaka, S., Laurienti, P.J., 2011a. The brain as a complex system: using network science as a tool for understanding the brain. *Brain Connect.* 1, 295–308.
- Telesford, Q.K., Joyce, K.E., Hayasaka, S., Burdette, J.H., Laurienti, P.J., 2011b. The ubiquity of small-world networks. *Brain Connect.* 1, 367–375.
- Terry, J.R., Benjamin, O., Richardson, M.P., 2012. Seizure generation: the role of nodes and networks. *Epilepsia* 53, e166–e169.
- Thomas, C., Ye, F.Q., Irfanoglu, M.O., Modi, P., Saleem, K.S., Leopold, D.A., Pierpaoli, C., 2014. Anatomical accuracy of brain connections derived from diffusion MRI tractography is inherently limited. *Proc. Natl. Acad. Sci. U. S. A.* 111, 16574–16579.
- Tomasi, D., Wang, G.J., Volkow, N.D., 2013. Energetic cost of brain functional connectivity. *Proc. Natl. Acad. Sci. U. S. A.* 110, 13642–13647.
- Tononi, G., Cirelli, C., 2014. Sleep and the price of plasticity: from synaptic and cellular homeostasis to memory consolidation and integration. *Neuron* 81, 12–34.
- Tononi, G., Edelman, G.M., Sporns, O., 1998. Complexity and coherency: integrating information in the brain. *Trends Cogn. Sci.* 2, 474–484.
- Tononi, G., Sporns, O., Edelman, G.M., 1994. A measure for brain complexity: relating functional segregation and integration in the nervous system. *Proc. Natl. Acad. Sci. U. S. A.* 91, 5033–5037.
- Tononi, G., Sporns, O., Edelman, G.M., 1999. Measures of degeneracy and redundancy in biological networks. *Proc. Natl. Acad. Sci. U. S. A.* 96, 3257–3262.
- Torricelli, A., Contini, D., Pifferi, A., Caffini, M., Re, R., Zucchelli, L., Spinelli, L., 2014. Time domain functional NIRS imaging for human brain mapping. *NeuroImage* 85 (Pt 1), 28–50.
- Tournier, J.-D., Mori, S., Leemans, A., 2011. Diffusion tensor imaging and beyond. *Magn. Reson. Med.* 65, 1532–1556.
- Tournier, J.D., Calamante, F., Gadian, D.G., Connelly, A., 2004. Direct estimation of the fiber orientation density function from diffusion-weighted MRI data using spherical deconvolution. *NeuroImage* 23, 1176–1185.
- Towlson, E.K., Vértes, P.E., Ahnert, S.E., Schafer, W.R., Bullmore, E.T., 2013. The rich club of the *C. elegans* neuronal connectome. *J. Neurosci.* 33, 6380–6387.
- Traag, V.A., Bruggeman, J., 2009. Community detection in networks with positive and negative links. *Phys. Rev. E* 80, 036115.
- Traag, V.A., Van Dooren, P., Nesterov, Y., 2011. Narrow scope for resolution-limit-free community detection. *Phys. Rev. E* 84, 016114.
- Trusina, A., Rosvall, M., Sneppen, K., 2005. Communication boundaries in networks. *Phys. Rev. Lett.* 94 (23), 238701.
- Tsodyks, M., Kenet, T., Grinvald, A., Arieli, A., 1999. Linking spontaneous activity of single cortical neurons and the underlying functional architecture. *Science* 286, 1943–1946.
- Tuch, D.S., Reese, T.G., Wiegell, M.R., Wedeen, V.J., 2003. Diffusion MRI of complex neural architecture. *Neuron* 40, 885–895.
- Tufte, E.R., 1990. Envisioning Information. Graphics Press, Cheshire, CT.

- Tutte, W.T., 1963. How to draw a graph. *Proc. Lond. Math. Soc.* 13, 743–768.
- Tzourio-Mazoyer, N., Landeau, B., Papathanassiou, D., Crivello, F., Etard, O., Delcroix, N., Mazoyer, B., Joliot, M., 2002. Automated anatomical labeling of activations in SPM using a macroscopic anatomical parcellation of the MNI MRI single-subject brain. *NeuroImage* 15, 273–289.
- Vaishnavi, S.N., Vlassenko, A.G., Rundle, M., Snyder, A.Z., Mintun, M.A., Raichle, M.E., 2010. Regional aerobic glycolysis in the human brain. *Proc. Natl. Acad. Sci. U. S. A.* 107, 17757–17762.
- Van De Ville, D., Seghier, M.L., Lazeyras, F., Blu, T., Unser, M., 2007. WSPM: wavelet-based statistical parametric mapping. *NeuroImage* 37 (4), 1205–1217.
- van den Heuvel, M., Mandl, R., Hulshoff Pol, H., 2008a. Normalized cut group clustering of resting-state fMRI data. *PLoS One* 3, e2001.
- van den Heuvel, M.P., Sporns, O., 2013a. Network hubs in the human brain. *Trends Cogn. Sci.* 17 (12), 683–696.
- van den Heuvel, M.P., Sporns, O., 2011. Rich-club organization of the human connectome. *J. Neurosci.* 31, 15775–15786.
- van den Heuvel, M.P., Sporns, O., 2013b. An anatomical substrate for integration among functional networks in human cortex. *J. Neurosci.* 33, 14489–14500.
- van den Heuvel, M.P., Kahn, R.S., Goñi, J., Sporns, O., 2012. High-cost, high-capacity backbone for global brain communication. *Proc. Natl. Acad. Sci. U. S. A.* 109, 11372–11377.
- van den Heuvel, M.P., Mandl, R.C.W., Stam, C.J., Kahn, R.S., Hulshoff Pol, H.E., 2010. Aberrant frontal and temporal complex network structure in schizophrenia: a graph theoretical analysis. *J. Neurosci.* 30, 15915–15926.
- van den Heuvel, M.P., Scholtens, L.H., de Reus, M.A., 2016. Topological organization of connectivity strength in the rat connectome. *Brain Struct. Funct.* <http://dx.doi.org/10.1007/s00429-015-0999-6>.
- van den Heuvel, M.P., Sporns, O., Collin, G., Scheewe, T., Mandl, R.C.W., Cahn, W., Goñi, J., Hulshoff Pol, H.E., Kahn, R.S., 2013a. Abnormal rich club organization and functional brain dynamics in schizophrenia. *JAMA Psychiatry* 70, 783–792.
- van den Heuvel, M.P., Stam, C.J., Boersma, M., Pol, H.E.H., 2008b. Small-world and scale-free organization of voxel-based resting-state functional connectivity in the human brain. *NeuroImage* 43, 528–539.
- van den Heuvel, M.P., Stam, C.J., Kahn, R.S., Hulshoff Pol, H.E., 2009. Efficiency of functional brain networks and intellectual performance. *J. Neurosci.* 29, 7619–7624.
- van den Heuvel, M.P., van Soelen, I.L., Stam, C.J., Kahn, R.S., Boomsma, D.I., Hulshoff Pol, H.E., 2013b. Genetic control of functional brain network efficiency in children. *Eur. Neuropsychopharmacol.* 23, 19–23.
- Van Essen, D.C., Ugurbil, K., 2012. The future of the human connectome. *NeuroImage* 62 (2), 1299–1310.
- Van Essen, D.C., 1997. A tension-based theory of morphogenesis and compact wiring in the central nervous system. *Nature* 385, 313–318.
- Van Essen, D.C., 2005. A population-average, landmark- and surface-based (PALS) atlas of human cerebral cortex. *NeuroImage* 28, 635–662.
- Van Essen, D.C., 2013. Cartography and connectomes. *Neuron* 80, 775–790.
- Van Essen, D.C., Smith, S.M., Barch, D.M., Behrens, T.E., Yacoub, E., Ugurbil, K., WU-Minn HCP Consortium, 2013. The WU-Minn Human Connectome Project: an overview. *NeuroImage* 80, 62–79.
- van Grootheest, D.S., Cath, D.C., Beekman, A.T., Boomsma, D.I., 2005. Twin studies on obsessive-compulsive disorder: a review. *Twin Res. Hum. Genet.* 8, 450–458.
- Van Horn, J.D., Irimia, A., Torgerson, C.M., Chambers, M.C., Kikinis, R., Toga, A.W., 2012. Mapping connectivity damage in the case of Phineas Gage. *PLoS One* 7, e37454.

- van Mieghem, P., 2012. Graph Spectra for Complex Networks. Cambridge University Press, Cambridge, MA.
- van Wijk, B.C.M., Stam, C.J., Daffertshofer, A., 2010. Comparing brain networks of different size and connectivity density using graph theory. *PLoS One* 5, e13701.
- Varela, F., Lachaux, J.P., Rodriguez, E., Martinerie, J., 2001. The brainweb: phase synchronization and large-scale integration. *Nat. Rev. Neurosci.* 2, 229–239.
- Variano, E.A., Lipson, H., 2004. Networks, dynamics, and modularity. *Phys. Rev. Lett.* 92, 188701.
- Varoquaux, G., Baronnet, F., Kleinschmidt, A., Fillard, P., Thirion, B., 2010. Detection of brain functional-connectivity difference in post-stroke patients using group-level covariance modeling. *Med. Image Comput. Comput. Assist. Interv.* 13 (Pt 1), 200–208.
- Varoquaux, G., Craddock, R.C., 2013. Learning and comparing functional connectomes across subjects. *NeuroImage* 80, 405–415.
- Varshney, L.R., Chen, B.L., Paniagua, E., Hall, D.H., Chklovskii, D.B., 2011. Structural properties of the *Caenorhabditis elegans* neuronal network. *PLoS Comput. Biol.* 7 (2), e1001066.
- Ventura-Antunes, L., Mota, B., Herculano-Houzel, S., 2013. Different scaling of white matter volume, cortical connectivity, and gyration across rodent and primate brains. *Front. Neuroanat.* 7, 3.
- Verplaetse, P., Dambre, J., Stroobandt, D., Campenhout, J.V., 2001. On partitioning vs. placement rent properties. In: International Workshop on System-Level Interconnect Prediction. pp. 33–40.
- Vértes, P.E., Alexander-Bloch, A.F., Gogtay, N., Giedd, J.N., Rapoport, J.L., Bullmore, E.T., 2012. Simple models of human brain functional networks. *Proc. Natl. Acad. Sci.* 109 (15), 5868–5873.
- Vértes, P.E., Bullmore, E.T., 2015. Growth connectomics—the organization and reorganization of brain networks during normal and abnormal development. *J. Child Psychol. Psychiatry* 56 (3), 299–320.
- Vicente, R., Gollo, L.L., Mirasso, C.R., Fischer, I., Pipa, G., 2008. Dynamical relaying can yield zero time lag neuronal synchrony despite long conduction delays. *Proc. Natl. Acad. Sci. U. S. A.* 105, 17157–17162.
- Viger, F., Latapy, M., 2005. Random generation of large connected simple graphs with prescribed degree distribution. *Comput. Comb.* 3595, 440–449.
- Vincent, J.L., Patel, G.H., Fox, M.D., Snyder, A.Z., Baker, J.T., Van Essen, D.C., Zempel, J.M., Snyder, L.H., Corbetta, M., Raichle, M.E., 2007. Intrinsic functional architecture in the anaesthetized monkey brain. *Nature* 447, 83–86.
- Vinh, N.X., Epps, J., Bailey, J., 2010. Information theoretic measures for clusterings comparison: variants, properties, normalization and correction for chance. *J. Mach. Learn. Res.* 11, 2837–2854.
- Vogelstein, J.T., Packer, A.M., Machado, T.A., Sippy, T., Babadi, B., Yuste, R., Paninski, L., 2010. Fast nonnegative deconvolution for spike train inference from population calcium imaging. *J. Neurophysiol.* 104, 3691–3704.
- von Economo, C., 1929. Cytoarchitectonics of the Human Cerebral Cortex. Oxford University Press, London.
- von Monakow, C., 1969. Diaschisis. In: Pribram, K.H. (Ed.), *Mood, States and Mind*. Penguin, Baltimore, MD, pp. 27–36.
- von Stein, A., Sarnthein, J., 2000. Different frequencies for different scales of cortical integration: from local gamma to long range alpha/theta synchronization. *Int. J. Psychophysiol.* 38, 301–313.
- Wang, C., Lizardo, O., Hachen, D., 2014. Algorithms for generating large-scale clustered random graphs. *Netw. Sci.* 2 (3), 403–415.

- Wang, J., Wang, L., Zang, Y., Yang, H., Tang, H., Gong, Q., Chen, Z., Zhu, C., He, Y., 2009. Parcellation-dependent small-world brain functional networks: a resting-state fMRI study. *Hum. Brain Mapp.* 30, 1511–1523.
- Wang, P., Lü, J., Yu, X., 2014. Identification of important nodes in directed biological networks: a network motif approach. *PLoS One* 9, e106132. 15.
- Wang, Q., Sporns, O., Burkhalter, A., 2012. Network analysis of corticocortical connections reveals ventral and dorsal processing streams in mouse visual cortex. *J. Neurosci.* 32, 4386–4399.
- Wang, S.P., Pei, W.J., 2008. First passage time of multiple Brownian particles on networks with applications. *Physica A* 387 (18), 4699–4708.
- Warren, D.E., Power, J.D., Bruss, J., Denburg, N.L., Waldron, E.J., Sun, H., Petersen, S.E., Tranel, D., 2014. Network measures predict neuropsychological outcome after brain injury. *Proc. Natl. Acad. Sci. U. S. A.* 111, 14247–14252.
- Watts, D.J., 2002. A simple model of global cascades on random networks. *Proc. Natl. Acad. Sci. U. S. A.* 99, 5766–5771.
- Watts, D.J., Strogatz, S.H., 1998. Collective dynamics of "small-world" networks. *Nature* 393, 440–442.
- Wedgeen, V.J., Hagmann, P., Tseng, W.-Y.I., Reese, T.G., Weisskoff, R.M., 2005. Mapping complex tissue architecture with diffusion spectrum magnetic resonance imaging. *Magn. Reson. Med.* 54, 1377–1386.
- Weimann, J.M., Marder, E., 1994. Switching neurons are integral members of multiple oscillatory networks. *Curr. Biol.* 4, 896–902.
- Weiner, N., 1948. *Cybernetics: Or Control and Communication in the Animal and the Machine*. Hermann & Cie/MIT Press, Paris/Cambridge, MA, ISBN: 978-0-262-73009-9.
- Welker, W., 1990. Why does cerebral cortex fissure and fold? A review of determinants of sulci and gyri. In: Jones, E.G., Peters, A. (Eds.), *Cerebral Cortex*. Plenum Press, New York, NY, pp. 3–136.
- Wernicke, C., 1906. *Grundriss der Psychiatrie in klinischen Vorlesungen*. Thieme, Leipzig.
- Wernicke, C., 1970. The aphasic symptom-complex: a psychological study on an anatomical basis. *Arch. Neurol.* 22 (3), 280.
- White, J.G., Southgate, E., Thomson, J.N., Brenner, S., 1986. The structure of the nervous system of the nematode *Caenorhabditis elegans*. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 314, 1–340.
- Wig, G.S., Laumann, T.O., Petersen, S.E., 2014. An approach for parcellating human cortical areas using resting-state correlations. *NeuroImage* 93, 276–291.
- Wig, G.S., Schlaggar, B.L., Petersen, S.E., 2011. Concepts and principles in the analysis of brain networks. *Ann. N. Y. Acad. Sci.* 1224, 126–146.
- Wilke, C., Worrell, G., He, B., 2010. Graph analysis of epileptogenic networks in human partial epilepsy. *Epilepsia* 52, 84–93.
- Winterer, G., Weinberger, D.R., 2004. Genes, dopamine and cortical signal-to-noise ratio in schizophrenia. *Trends Neurosci.* 27, 683–690.
- Wolf, L., Goldberg, C., Manor, N., Sharan, R., Ruppin, E., 2011. Gene expression in the rodent brain is associated with its regional connectivity. *PLoS Comput. Biol.* 7 (5), e1002040.
- Womelsdorf, T., Valiante, T.A., Sahin, N.T., Miller, K.J., Tiesinga, P., 2014. Dynamic circuit motifs underlying rhythmic gain control, gating and integration. *Nat. Rev. Neurosci.* 17, 1031–1039.
- Wong, E., Baur, B., Quader, S., Huang, C.H., 2012. Biological network motif detection: principles and practice. *Brief. Bioinform.* 13, 202–215.
- Xia, M., He, Y., 2011. Magnetic resonance imaging and graph theoretical analysis of complex brain networks in neuropsychiatric disorders. *Brain Connect.* 1 (5), 349–365.

- Xie, J., Kelley, S., Szymanski, B.K., 2013. Overlapping community detection in networks. *ACM Comput. Surv.* 45, 1–35.
- Xie, J., Szymanski, B.K., Liu, X., 2011. SLPA: uncovering overlapping communities in social networks via a speaker-listener interaction dynamic process. In: IEEE 11th International Conference on Data Mining Workshops (ICDMW), pp. 344–349.
- Yatsenko, D., Josić, K., Ecker, A.S., Froudarakis, E., Cotton, R.J., Tolias, A.S., 2015. Improved estimation and interpretation of correlations in neural circuits. *PLoS Comput. Biol.* 11, e1004083. 28.
- Yeo, B.T., Krienen, F.M., Sepulcre, J., Sabuncu, M.R., Lashkari, D., Hollinshead, M., Roffman, J.L., Smoller, J.W., Zollei, L., Polimeni, J.R., et al., 2011. The organization of the human cerebral cortex estimated by intrinsic functional connectivity. *J. Neurophysiol.* 106, 1125–1165.
- Yeterian, E.H., Pandya, D.N., 1991. Prefrontostriatal connections in relation to cortical architectonic organization in rhesus monkeys. *J. Comp. Neurol.* 312, 43–67.
- Yip, A.M., Horvath, S., 2007. Gene network interconnectedness and the generalized topological overlap measure. *BMC Bioinf.* 8, 22.
- Young, M.P., 1992. Objective analysis of the topological organization of the primate cortical visual system. *Nature* 358, 152–155.
- Young, M.P., Hilgetag, C.C., Scannell, J.W., 2000. On imputing function to structure from the behavioural effects of brain lesions. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 355, 147–161.
- Young, M.P., Scannell, J.W., O'Neill, M.A., Hilgetag, C.C., Burns, G., Blakemore, C., 1995. Non-metric multidimensional scaling in the analysis of neuroanatomical connection data and the organization of the primate cortical visual system. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 348, 281–308.
- Yu, S., Huang, D., Singer, W., Nikolic, D., 2008. A small world of neuronal synchrony. *Cereb. Cortex* 18, 2891–2901.
- Yule, G.U., 1925. A mathematical theory of evolution, based on the conclusions of Dr. J. C. Willis, F. R.S. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 213, 21–87.
- Yuste, R., 2015. From the neuron doctrine to neural networks. *Nat. Rev. Neurosci.* 16, 487–497.
- Zalesky, A., 2008. DT-MRI fiber tracking: a shortest paths approach. *IEEE Trans. Med. Imaging* 27 (10), 1458–1471.
- Zalesky, A., 2009. To burst or circuit switch? *IEEE/ACM Trans. Networking* 17 (1), 305–318.
- Zalesky, A., Breakspear, M., 2015. Towards a statistical test for functional connectivity dynamics. *NeuroImage* 114, 466–470.
- Zalesky, A., Fornito, A., 2009. A DTI-derived measure of cortico-cortical connectivity. *IEEE Trans. Med. Imaging* 28, 1023–1036.
- Zalesky, A., Cocchi, L., Fornito, A., Murray, M.M., Bullmore, E., 2012a. Connectivity differences in brain networks. *NeuroImage* 60 (2), 1055–1062.
- Zalesky, A., Fornito, A., Bullmore, E., 2012b. On the use of correlation as a measure of network connectivity. *NeuroImage* 60 (4), 2096–2106.
- Zalesky, A., Fornito, A., Bullmore, E.T., 2010a. Network-based statistic: identifying differences in brain networks. *NeuroImage* 53, 1197–1207.
- Zalesky, A., Fornito, A., Cocchi, L., Gollo, L.L., Breakspear, M., 2014. Time-resolved resting-state brain networks. *Proc. Natl. Acad. Sci. U. S. A.* 111, 10341–10346.
- Zalesky, A., Fornito, A., Egan, G.F., Pantelis, C., Bullmore, E., 2012c. The relationship between regional and inter-regional functional connectivity deficits in schizophrenia. *Hum. Brain Mapp.* 33 (11), 2535–2549.
- Zalesky, A., Fornito, A., Harding, I.H., Cocchi, L., Yucel, M., Pantelis, C., Bullmore, E.T., 2010b. Whole-brain anatomical networks: does the choice of nodes matter? *NeuroImage* 50, 970–983.

- Zalesky, A., Fornito, A., Seal, M.L., Cocchi, L., Westin, C.F., Bullmore, E.T., Egan, G.F., Pantelis, C., 2011. Disrupted axonal fiber connectivity in schizophrenia. *Biol. Psychiatry* 69 (1), 80–89.
- Zalesky, A., Vu, H.L., Rosberg, Z., Wong, E.W.M., Zukerman, M., 2007. OBS contention resolution performance. *Perform. Eval.* 64 (4), 357–373.
- Zamfirescu, T., 1976. On longest paths and circuits in graphs. *Math. Scand.* 38, 211–239.
- Zamora-López, G., Zhou, C., Kurths, J., 2010. Cortical hubs form a module for multisensory integration on top of the hierarchy of cortical networks. *Front. Neuroinform.* 4, 1.
- Zatorre, R.J., Fields, R.D., Johansen-Berg, H., 2012. Plasticity in gray and white: neuroimaging changes in brain structure during learning. *Nat. Neurosci.* 15, 528–536.
- Zeki, S., 2001. Localization and globalization in conscious vision. *Annu. Rev. Neurosci.* 24, 57–86.
- Zeng, L.L., Shen, H., Liu, L., Wang, L., Li, B., Fang, P., Zhou, Z., Li, Y., Hu, D., 2012. Identifying major depression using whole-brain functional connectivity: a multivariate pattern analysis. *Brain* 135 (Pt 5), 1498–1507.
- Zhang, X., Martin, T., Newman, M.E.J., 2015. Identification of core-periphery structure in networks. *Phys. Rev. E* 91, 032803.
- Zhou, H., 2003. Network landscape from a Brownian particle's perspective. *Phys. Rev. E* 67, 041908.
- Zhou, J., Gennatas, E.D., Kramer, J.H., Miller, B.L., Seeley, W.W., 2012. Predicting regional neurodegeneration from the healthy brain functional connectome. *Neuron* 73, 1216–1227.
- Zhou, S., Mondragón, R.J., 2004. The rich-club phenomenon in the Internet topology. *IEEE Commun. Lett.* 8, 180–182.
- Zilles, K., Palomero-Gallagher, N., Grefkes, C., Scheperjans, F., Boy, C., Amunts, K., Schleicher, A., 2002. Architectonics of the human cerebral cortex and transmitter receptor fingerprints: reconciling functional neuroanatomy and neurochemistry. *Eur. Neuropsychopharmacol.* 12, 587–599.
- Zingg, B., Hintiryan, H., Gou, L., Song, M.Y., Bay, M., Bienkowski, M.S., Foster, N.N., Yamashita, S., Bowman, I., Toga, A.W., Dong, H.W., 2014. Neural networks of the mouse neocortex. *Cell* 156, 1096–1111.
- Zipf, G., 1936. *The Psychobiology of Language*. Routledge, London.
- Zipf, G., 1949. *Human Behavior and the Principle of Least Effort*. Addison-Wesley, New York, NY.
- Zuo, X.N., Ehmke, R., Mennes, M., Imperati, D., Castellanos, F.X., Sporns, O., Milham, M.P., 2012. Network centrality in the human functional connectome. *Cereb. Cortex* 22, 1862–1875.