

From static visualisation to immersive analytics of biological networks

Falk Schreiber

University of Konstanz, Konstanz, Germany

Modern technologies used in the life sciences produce huge amounts of data about the building blocks of organisms. For an integrative, systems biology directed approach it is not sufficient to consider the biological entities alone but is necessary to study their interactions and to link the experimental data to the underlying biological processes. The key to this integration is biological networks and the development of methods for the modelling, analysis, simulation, and interactive visualisation of these networks and related multimodal data.

This talk presents different aspects of visualising and exploring biological network data, starting with a brief review of biological network visualisation in the past (1), looking at information visualisation approaches for presentation and exploration of biological networks (2-4) as well as standardised visual representations of biological information (5,6), and presenting novel developments for immersive analytics of multimodal biological data including networks (7). The talk will discuss methodological developments and present tools implementing these methods.

References:

- (1) C. Bachmaier et al. Biological networks. Handbook of Graph Drawing and Visualization, FLCRC Press, 621-651, 2014
- (2) F. Schreiber et al. Heterogeneous networks on multiple levels, In: Multivariate Network Visualization, 175-206, Springer, 2014
- (3) H. Rohn et al., Creating views on integrated multidomain data, Bioinformatics 27, 1839-1845, 2011
- (4) F. Schreiber et al. A generic algorithm for layout of biological networks, BMC Bioinformatics 10, 375, 2009
- (5) N. Le Novere et al. The Systems Biology Graphical Notation, Nature Biotechnology 27, 735-741, 2009
- (6) T. Czauderna et al., Editing, validating and translating of SBGN maps, Bioinformatics 26, 2340-2341, 2010
- (7) T. Chandler et al. Immersive Analytics, IEEE Big Data Visual Analytics 1-8, 2015