

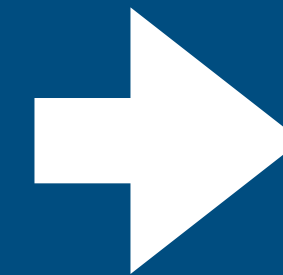
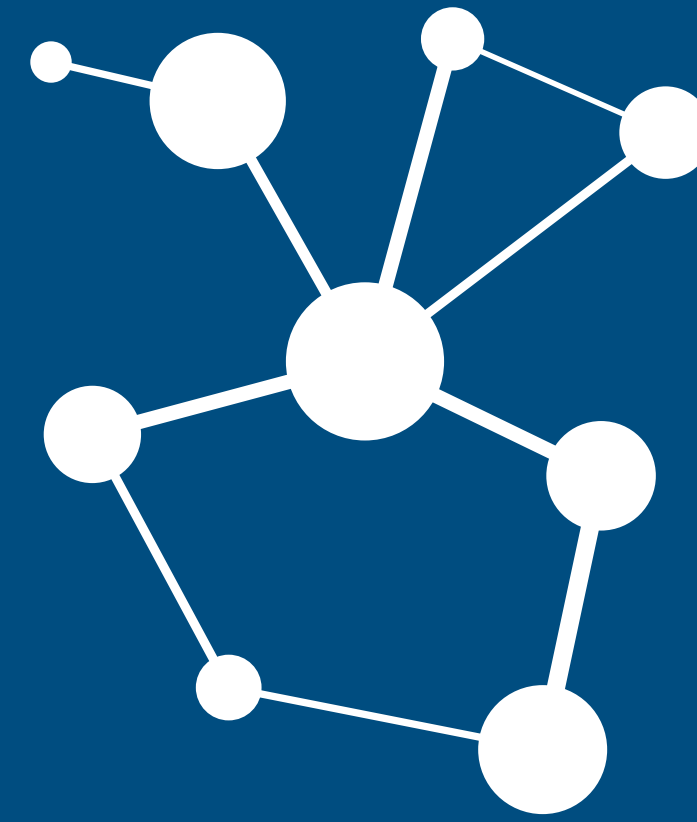
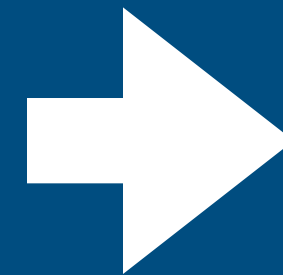


A network science toolbox for Brainlife

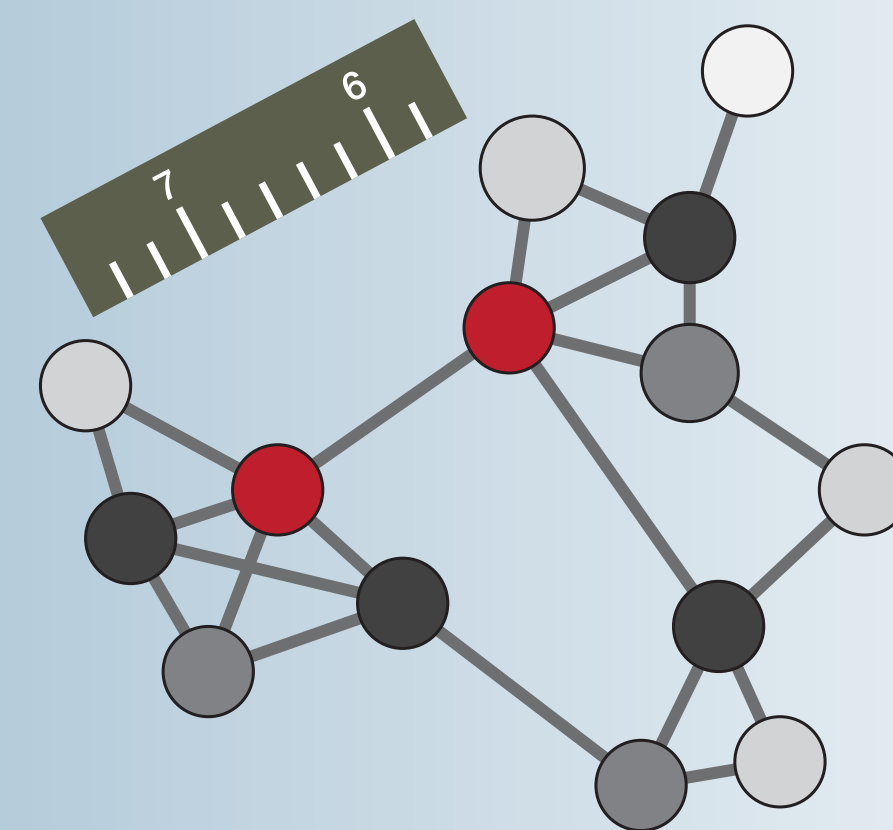
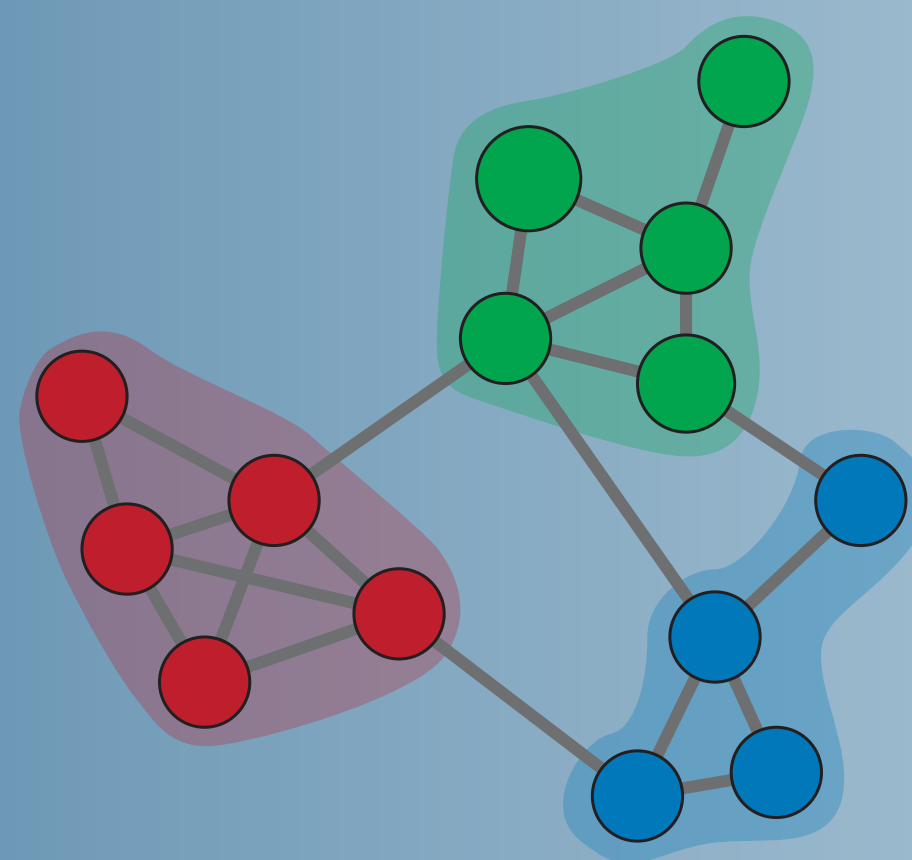
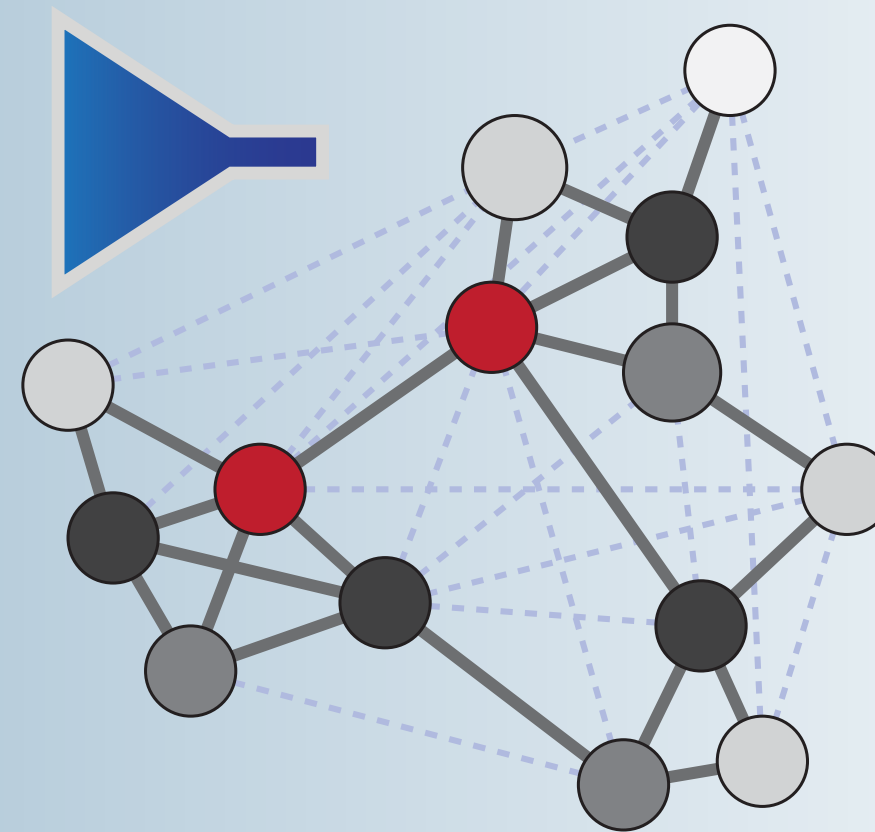
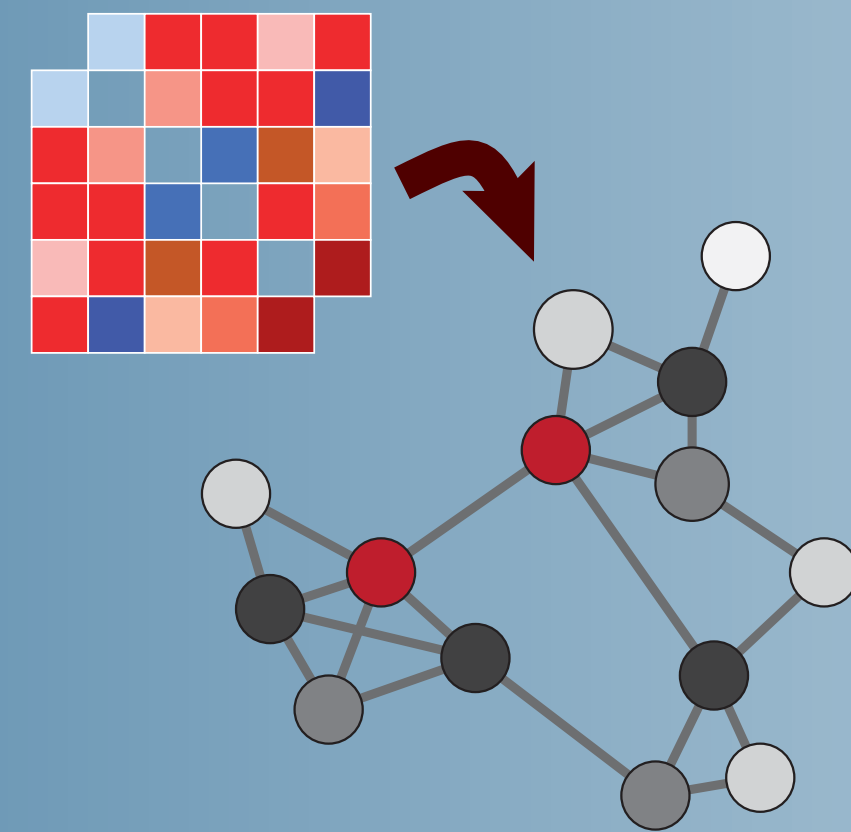
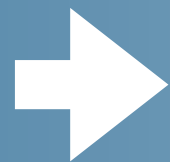
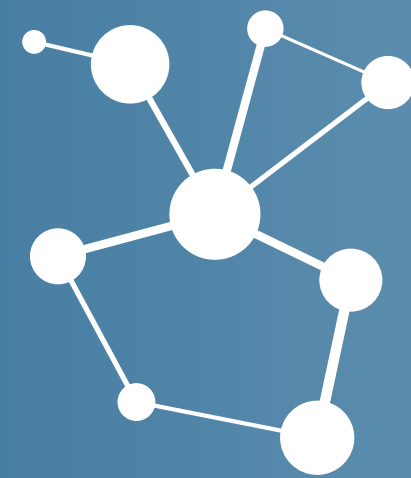
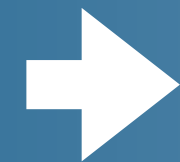
[Filipi N. Silva](#)

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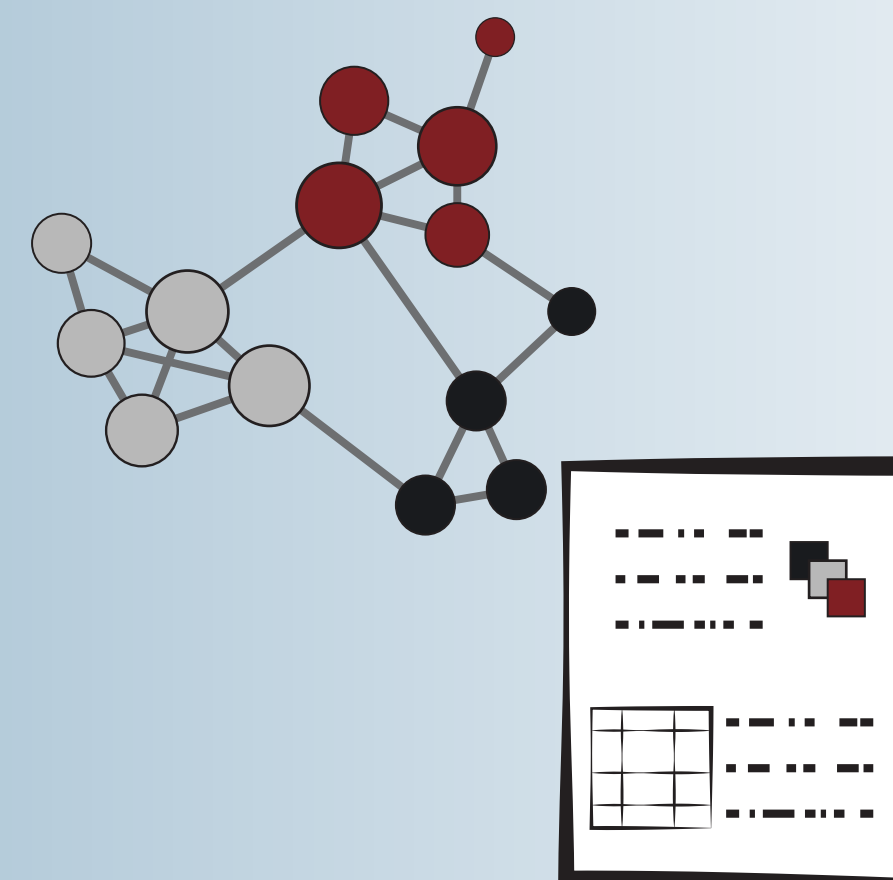
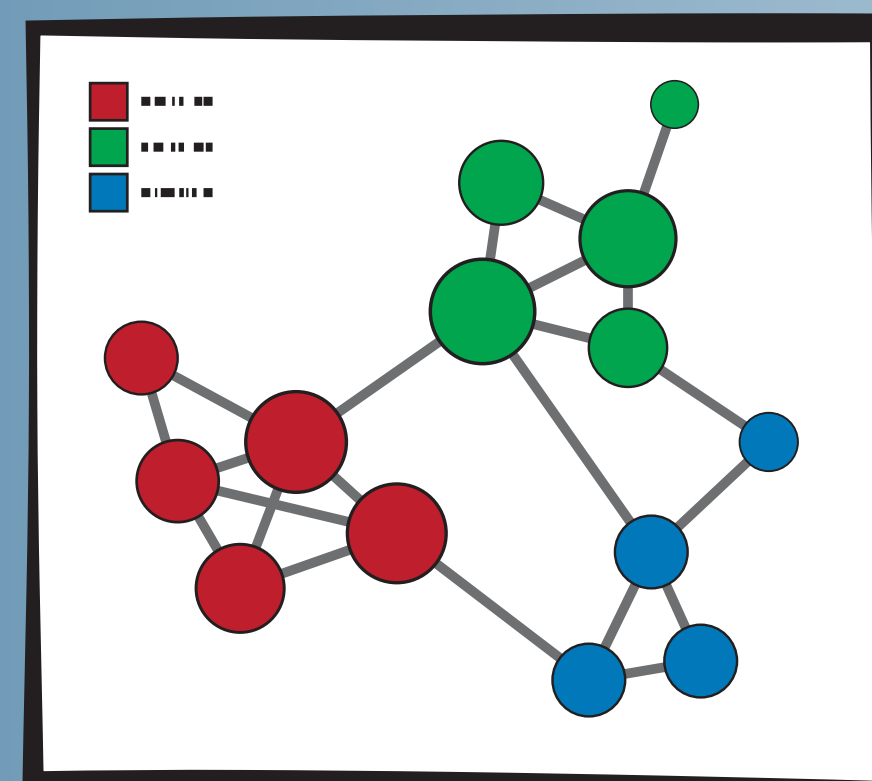
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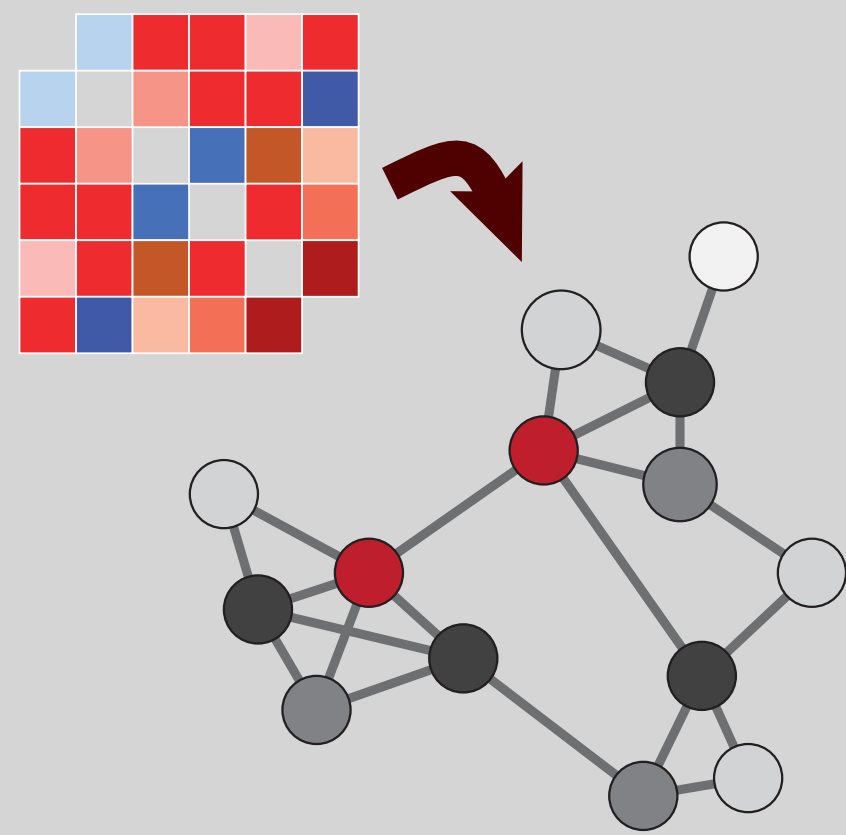


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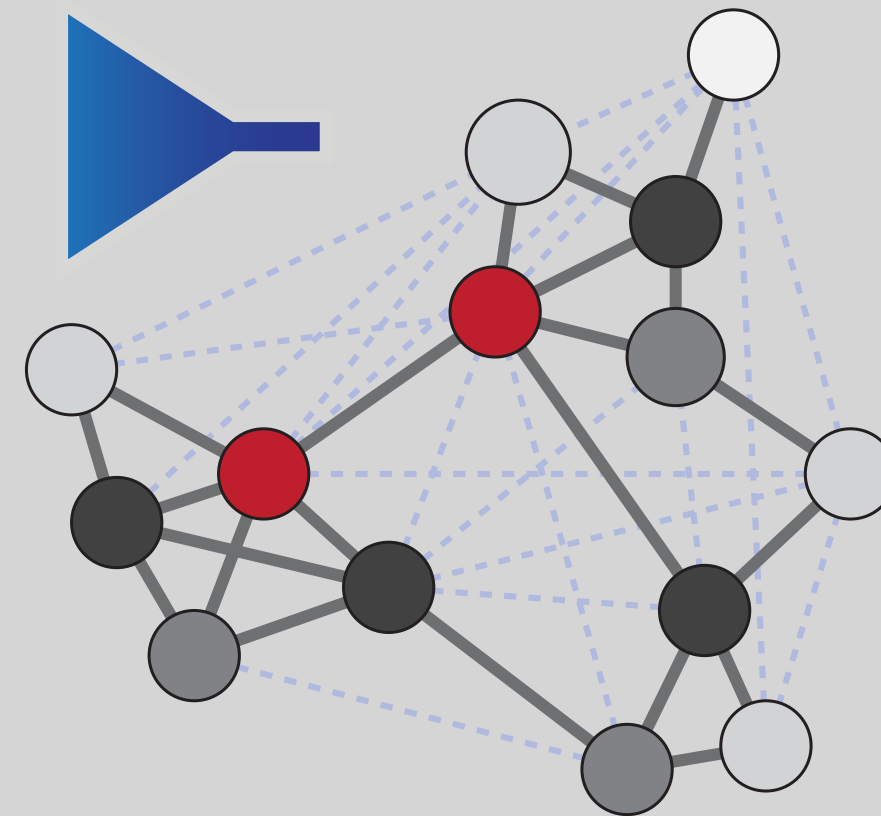
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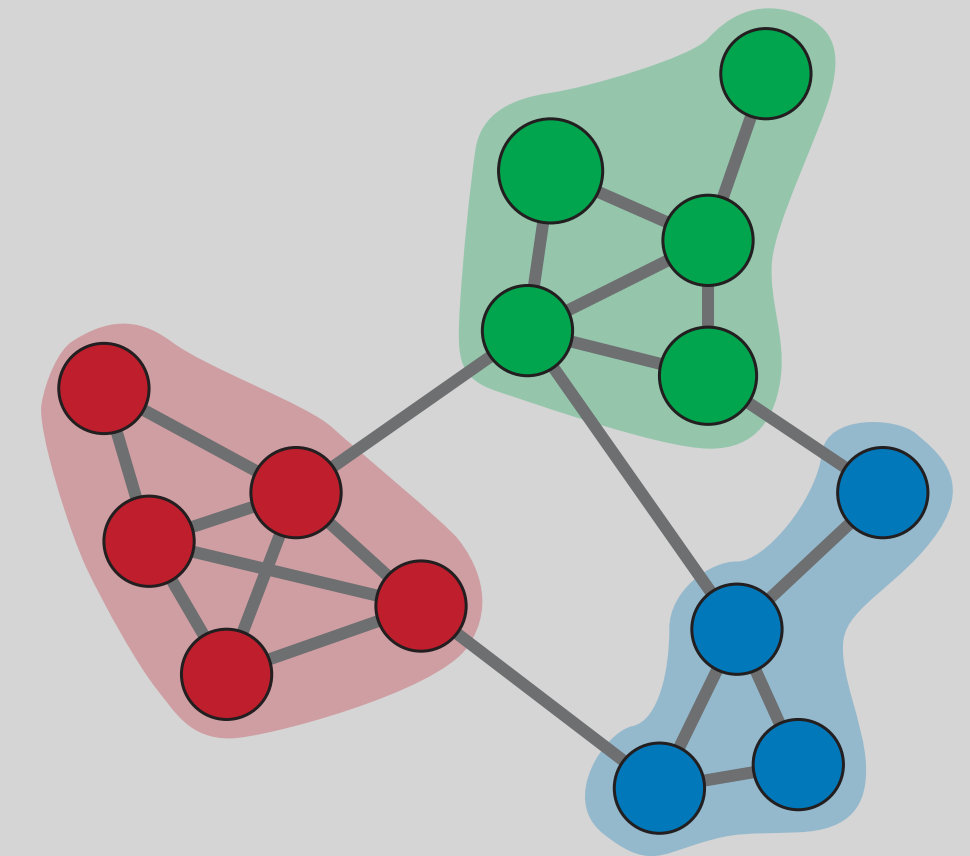
Network from
connectivity
matrix

Uses compressed
JsonGraph (JGF)
to store connections
and metadata



Preprocess
network

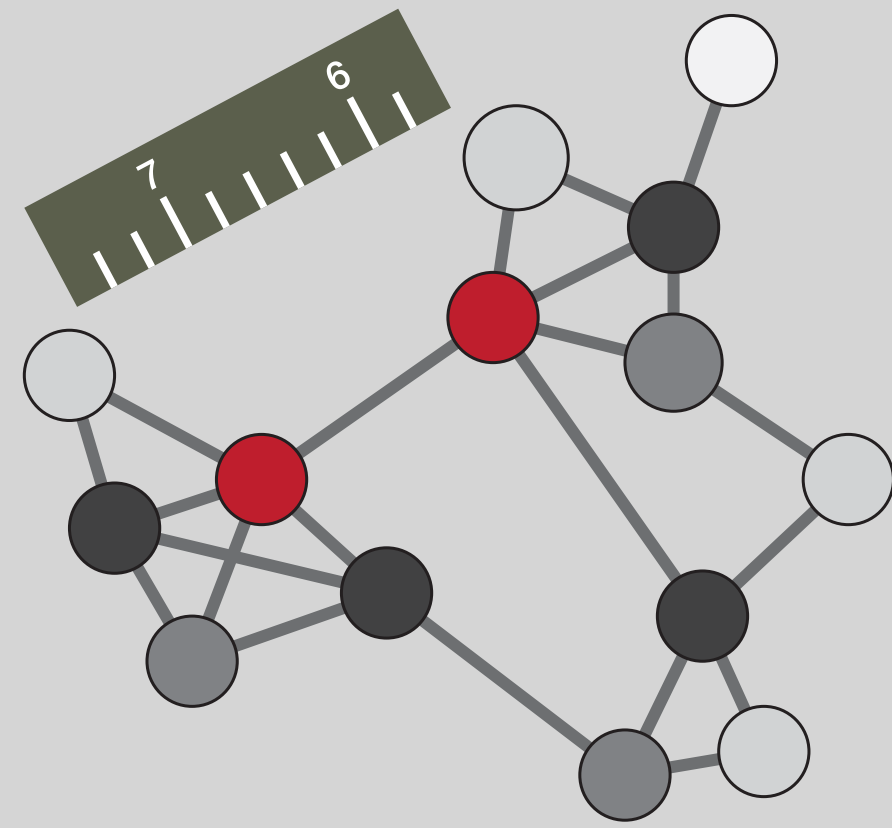
Use this App to apply thresholds
based on percentile. handles
negative weights as
layered networks



Detect communities

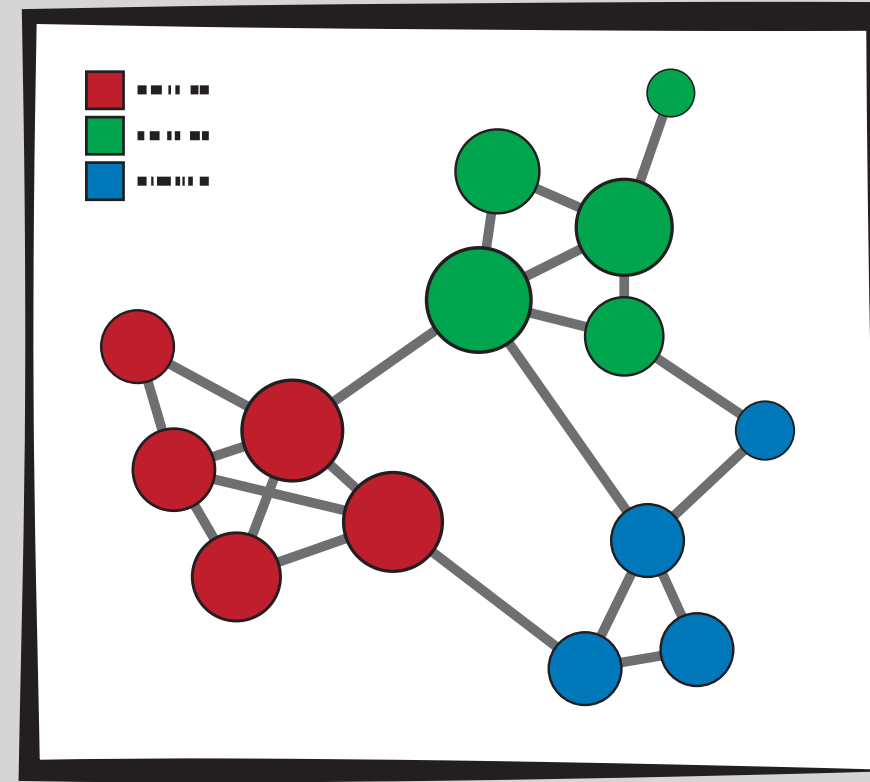
Implementation for
Louvain, Infomap
and SBM*

*SBM option will be available soon



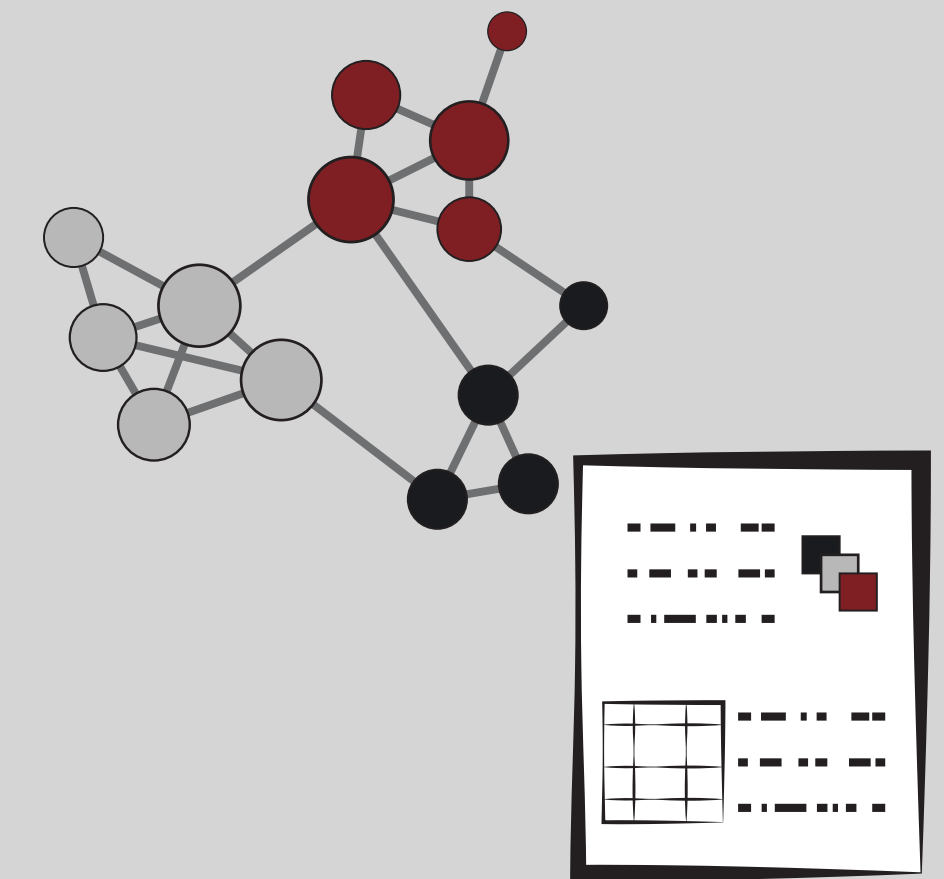
Network measurements

Obtain several network measurements, including: strength, clustering coeff., centralities, etc



Network visualization

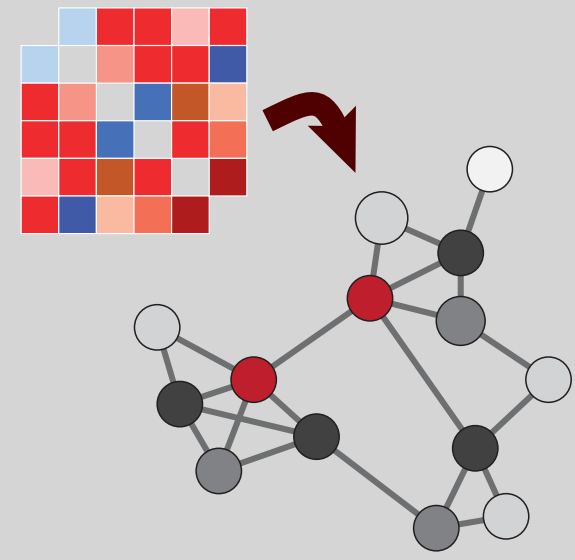
Creates a simple visualization of the networks. Colors and size of nodes can be associated to other network properties



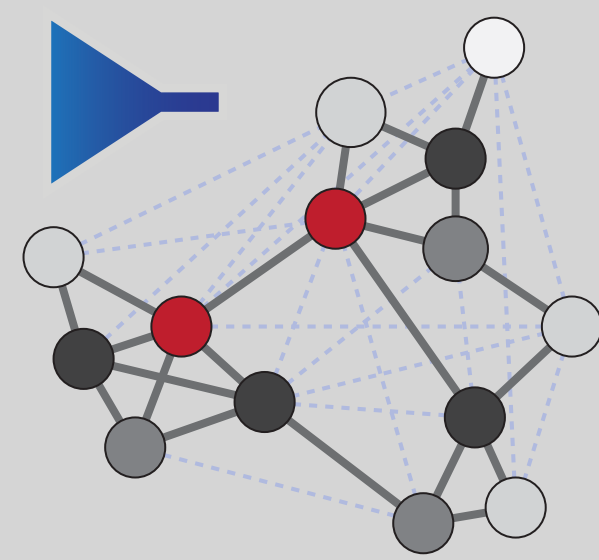
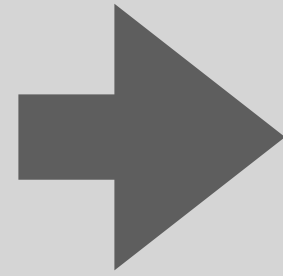
Network report*

Build tables and plots for metadata and measurements stored in the networks

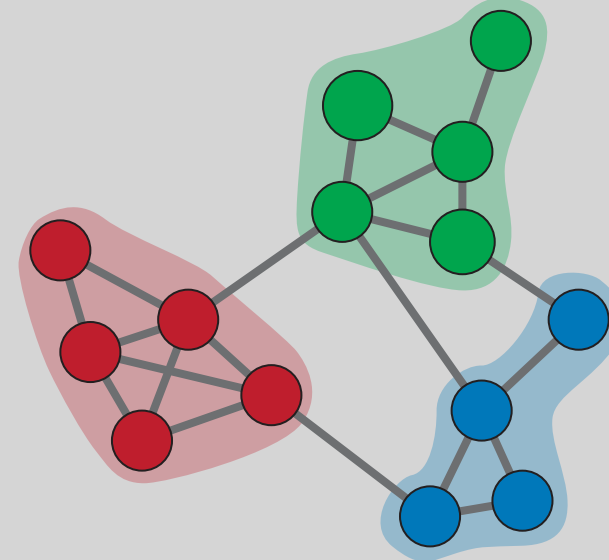
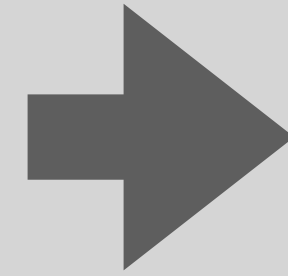
*Network report will be available soon



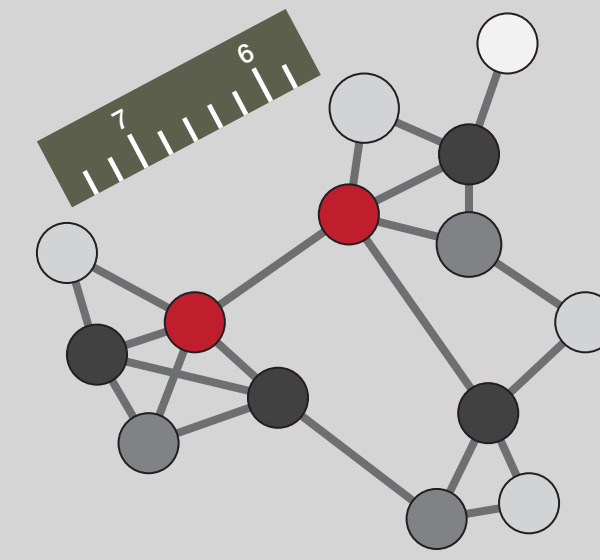
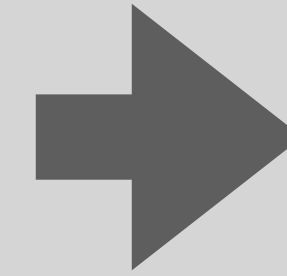
Network from connectivity matrix



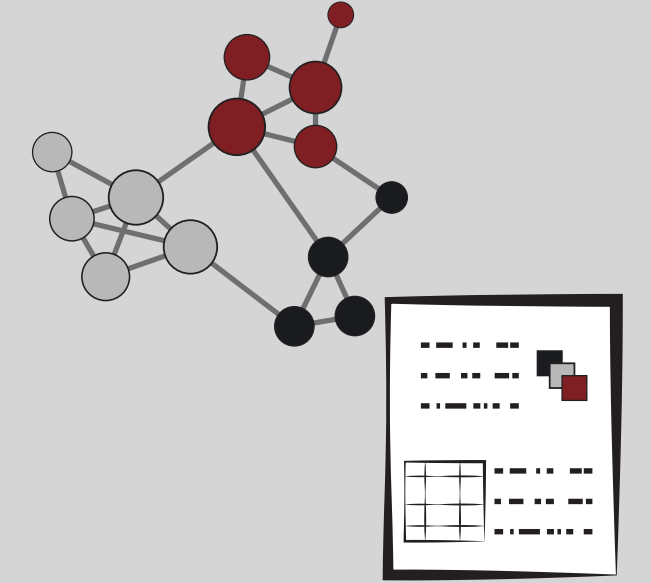
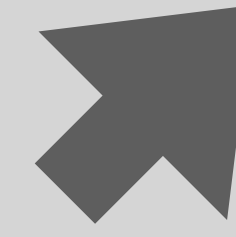
Preprocess



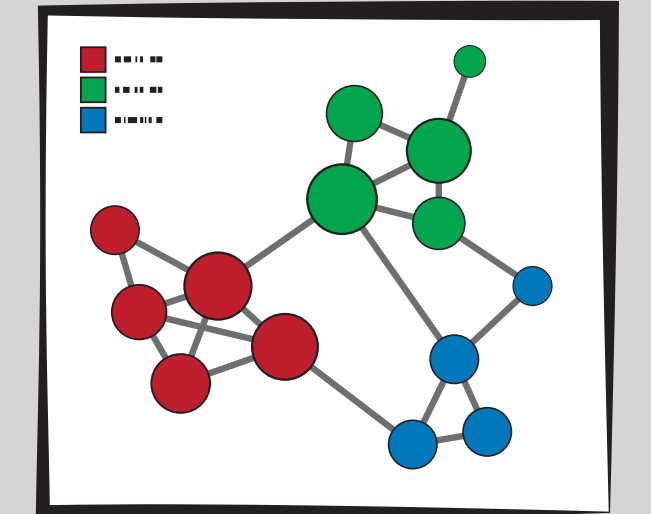
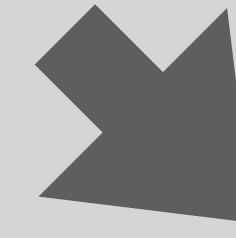
Community detection



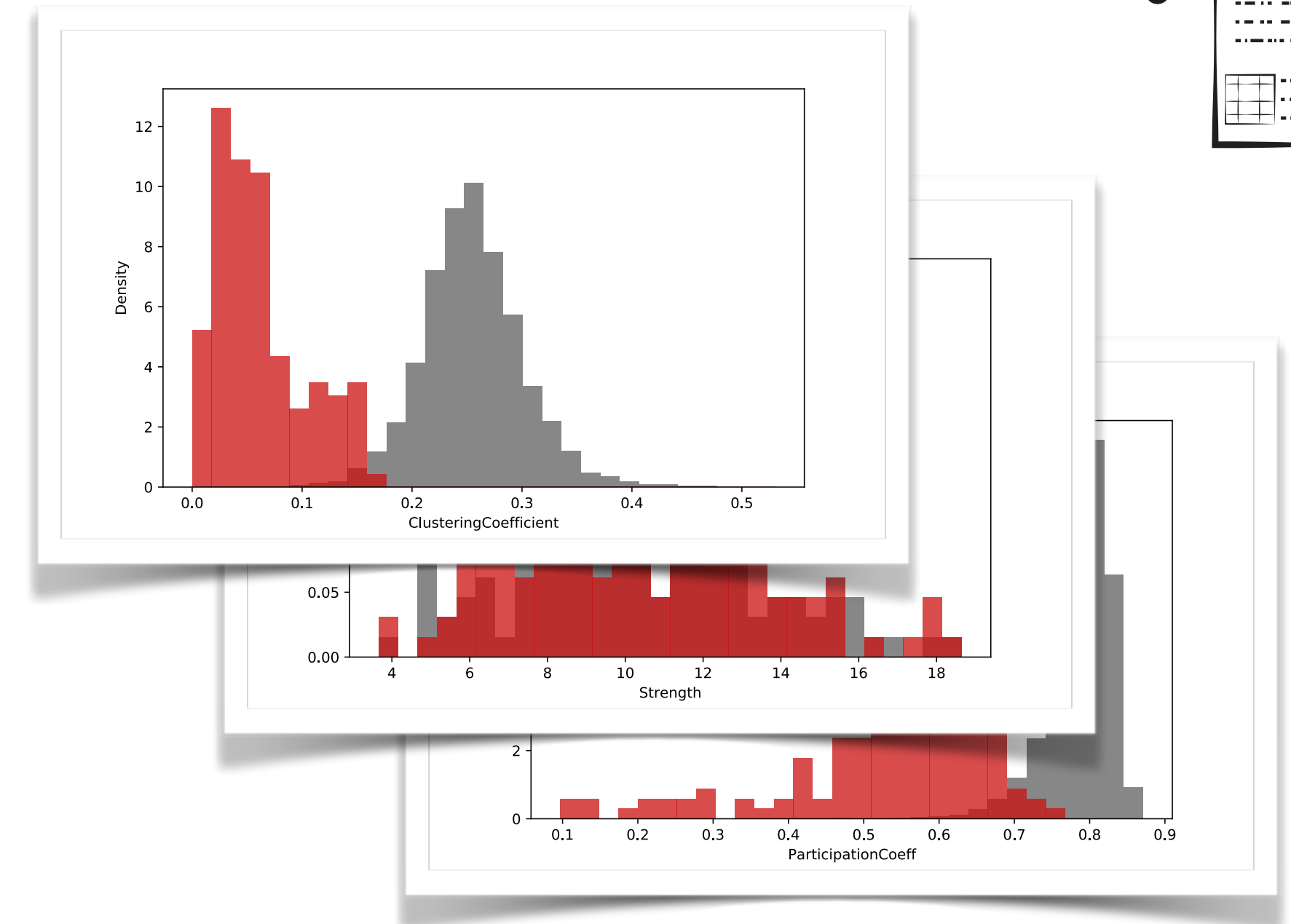
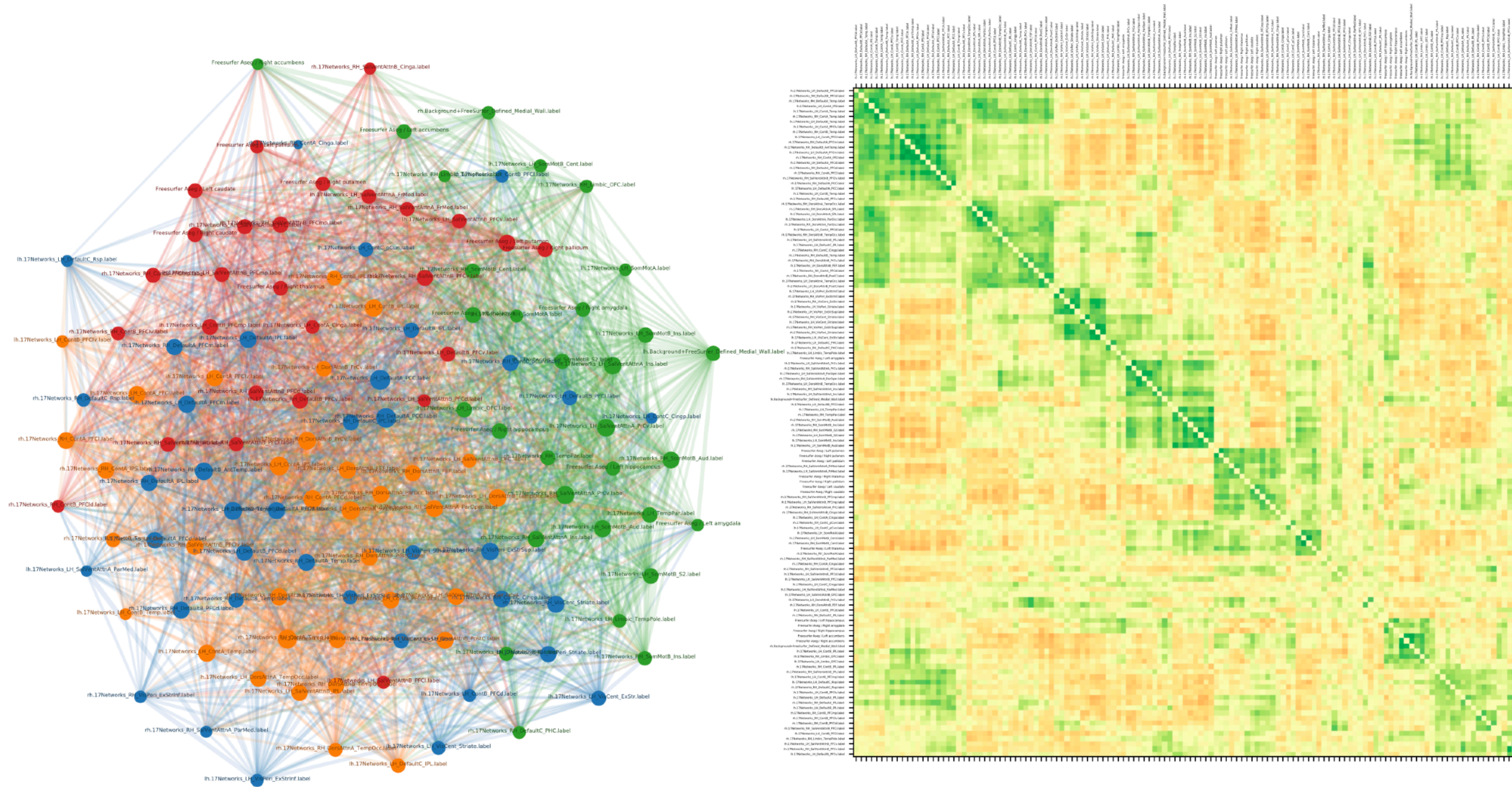
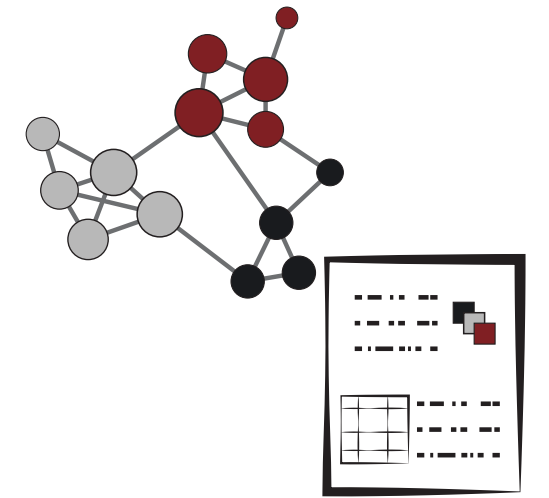
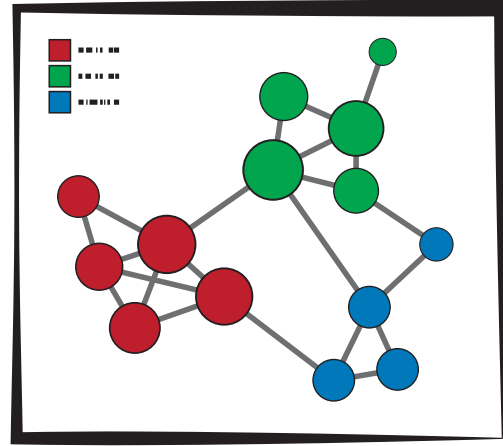
Network measurements



Network report

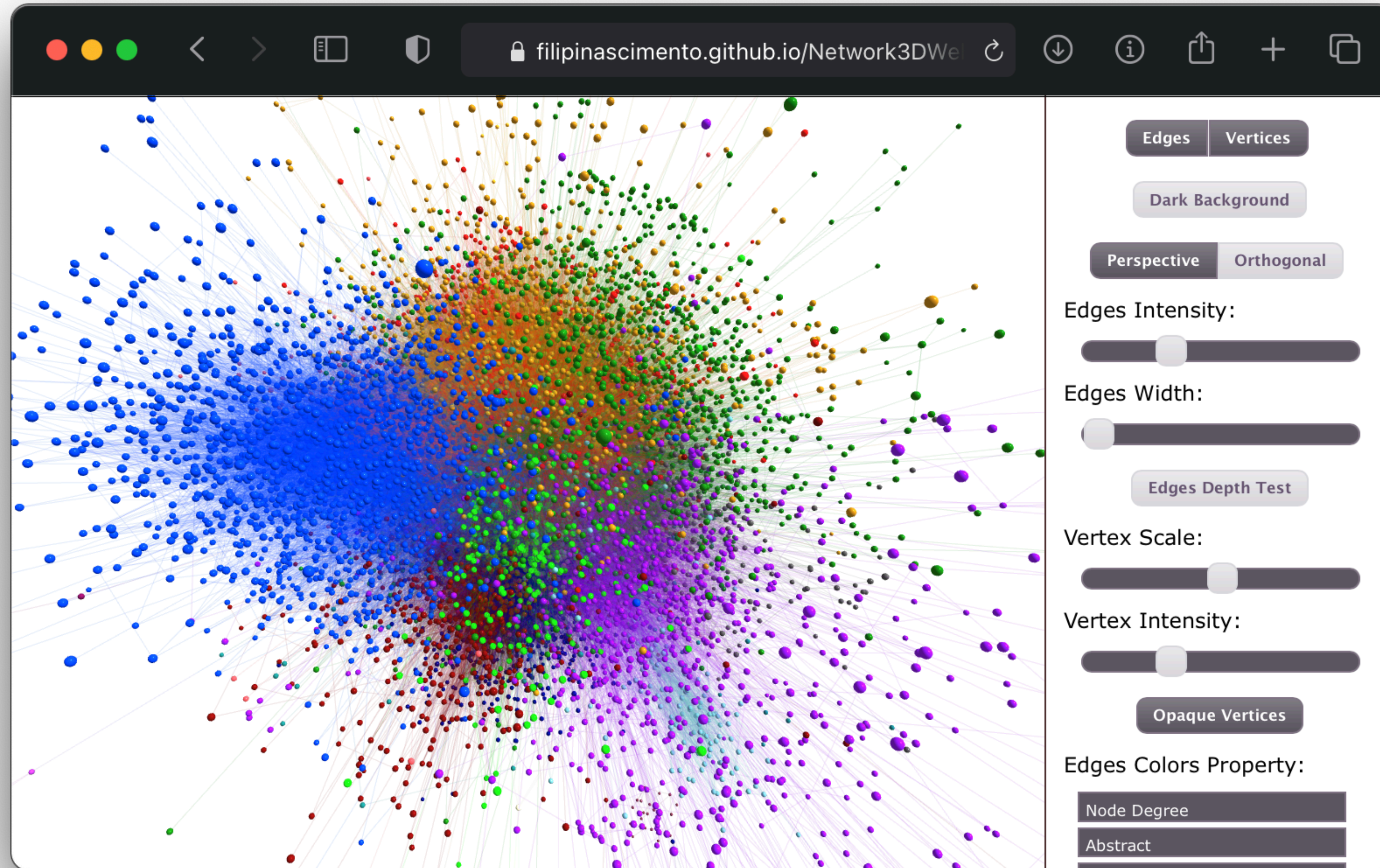


Network visualization



Measurement	Value	Null model avg. (std. dev.)
Degree	28.58	28.58 ± 0
Strength	10.46	10.46 ± 0
Clustering Coefficient	0.52	0.248 ± 0.003
Match Index	0.25	0.120 ± 0.001
Betweenness Centrality	60.39	50.60 ± 0.06
Betweenness Centrality Weighted	65.77	50.60 ± 0.06
Betweenness Centralization	0.02	0.013 ± 0.001
Rich-Club Coefficient	0.57	0.42 ± 0.02
Degree Assortativity	0.35	-0.01 ± 0.02
Diameter	1.04	1.10 ± 0
Modularity	0.41	0.131 ± 0.005

What is next?



Interactive network visualizer

<p>Network Null Model filipinascimento/bl-network-nullmodel 0.2</p> <p>● network → ● network null-model</p> <p>Generates an ensemble of networks according to null models that try to reproduce the data. Erdos reyni (random), Barabási-Albert and Configuration model are implemented</p> <p>▶ 9 👤 3 ☰ 2 ✓ 77.8%</p>	<p>Network Preprocess filipinascimento/bl-network-preprocess 0.2</p> <p>● network → ● network network-preprocess</p> <p>App to preprocess connectivity/similarity matrices (conmat) and generate a filtered version of the network, which can be directed or undirected, weighted or unweighted.</p> <p>▶ 18 👤 6 ☰ 4 ✓ 80.0%</p>	<p>Network Communities filipinascimento/bl-network-communities 0.2</p> <p>● network → ● network communities</p> <p>App to obtain the community structure of networks by using the Louvain or Infomap methods. All the Louvain quality functions work for networks with negative weights.</p> <p>▶ 22 👤 5 ☰ 2 ✓ 61.1%</p>
<p>Network Visualization filipinascimento/bl-network-visualization 0.2</p> <p>● network → ● pdf visualization</p> <p>This app generates simple 2D static visualizations for networks by using a force-directed algorithm. The current implementation uses the Large Graph Layout (LGL) algorithm.</p> <p>▶ 59 👤 19 ☰ 2 ✓ 69.1%</p>	<p>Network Measurements filipinascimento/bl-network-measurements 0.2</p> <p>● network → ● network measurements</p> <p>App to calculate several basic statistics for networks and their respective null model distributions.</p> <p>▶ 15 👤 4 ☰ 1 ✓ 45.5%</p>	<p>Conmat 2 Network filipinascimento/bl-conmat2network 0.2</p> <p>● conmat → ● network</p> <p>Simple brainlife app to create a network from a conmat matrix.</p> <p>▶ 8 👤 3 ☰ 3 ✓ 100.0%</p>

<https://brainlife.io/apps#network>

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