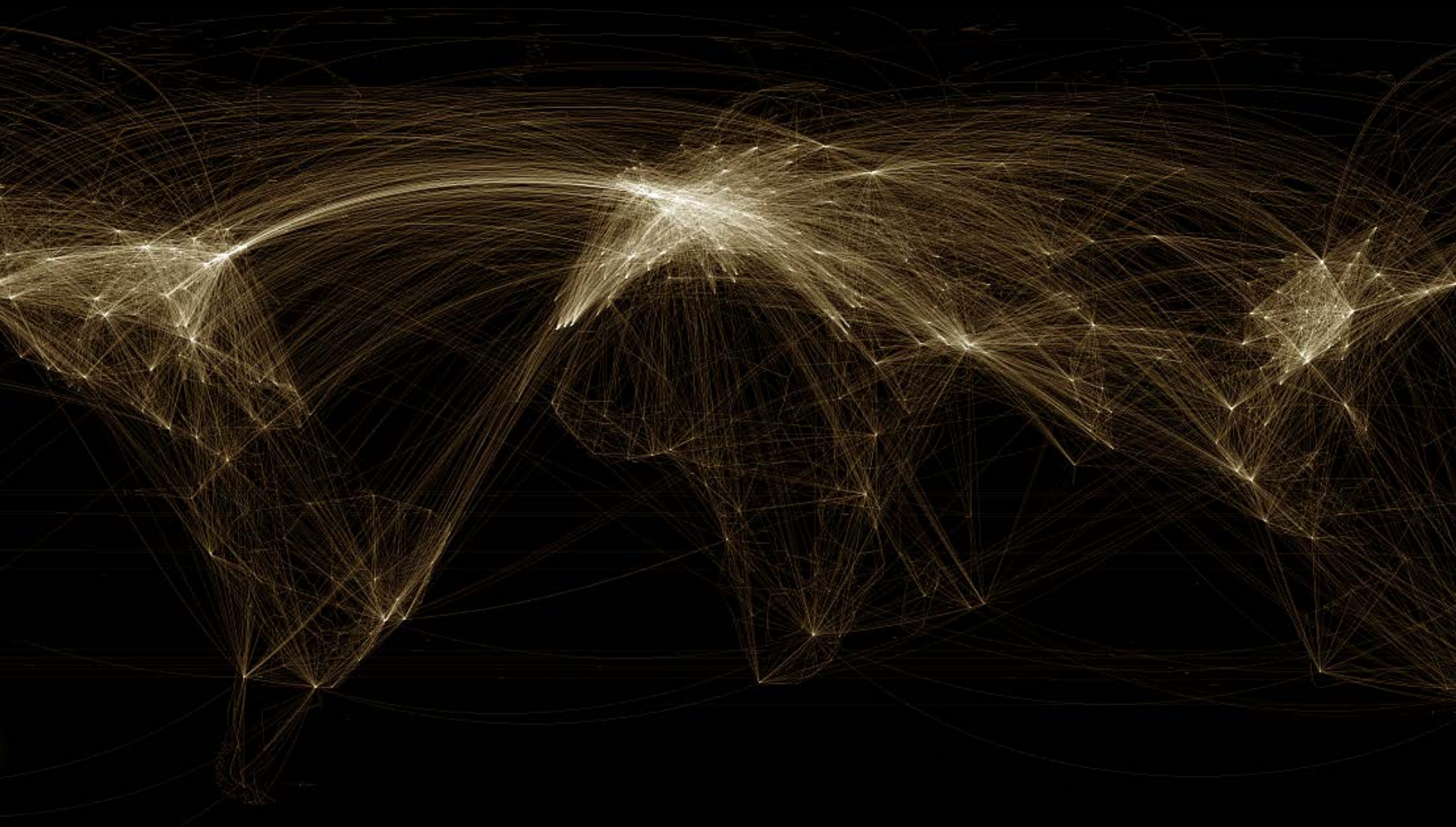


Static and Dynamic  
**Network** Visualization  
with **Gephi** (NULab, 2014)



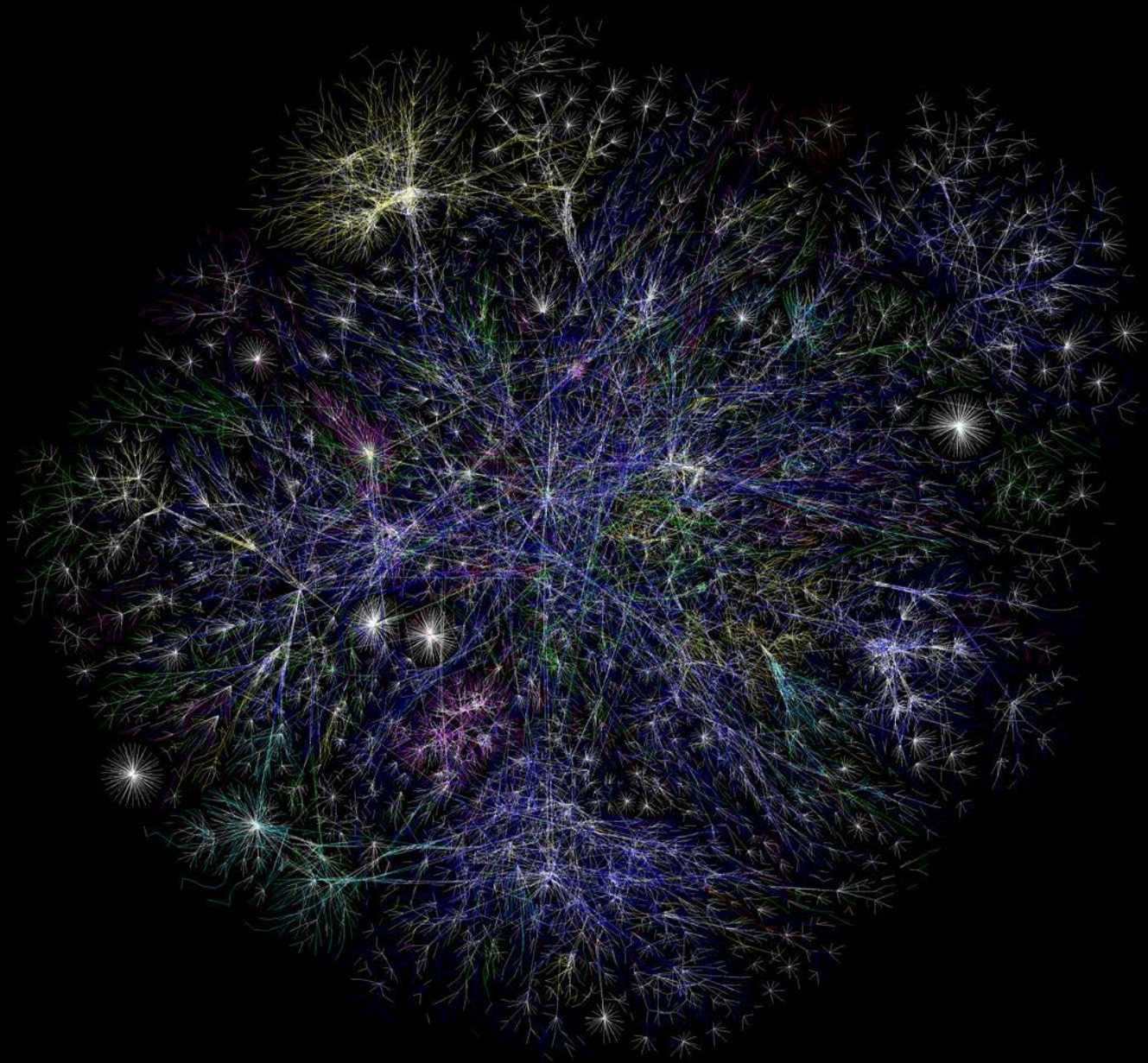
Katherine Ognyanova (Katya) • Postdoctoral Research Fellow, The Lazer Lab  
Email: [katya@ognyanova.net](mailto:katya@ognyanova.net) • Website: [www.kateto.net](http://www.kateto.net) • Twitter: [@ognyanova](https://twitter.com/ognyanova)

Where do we see network data?



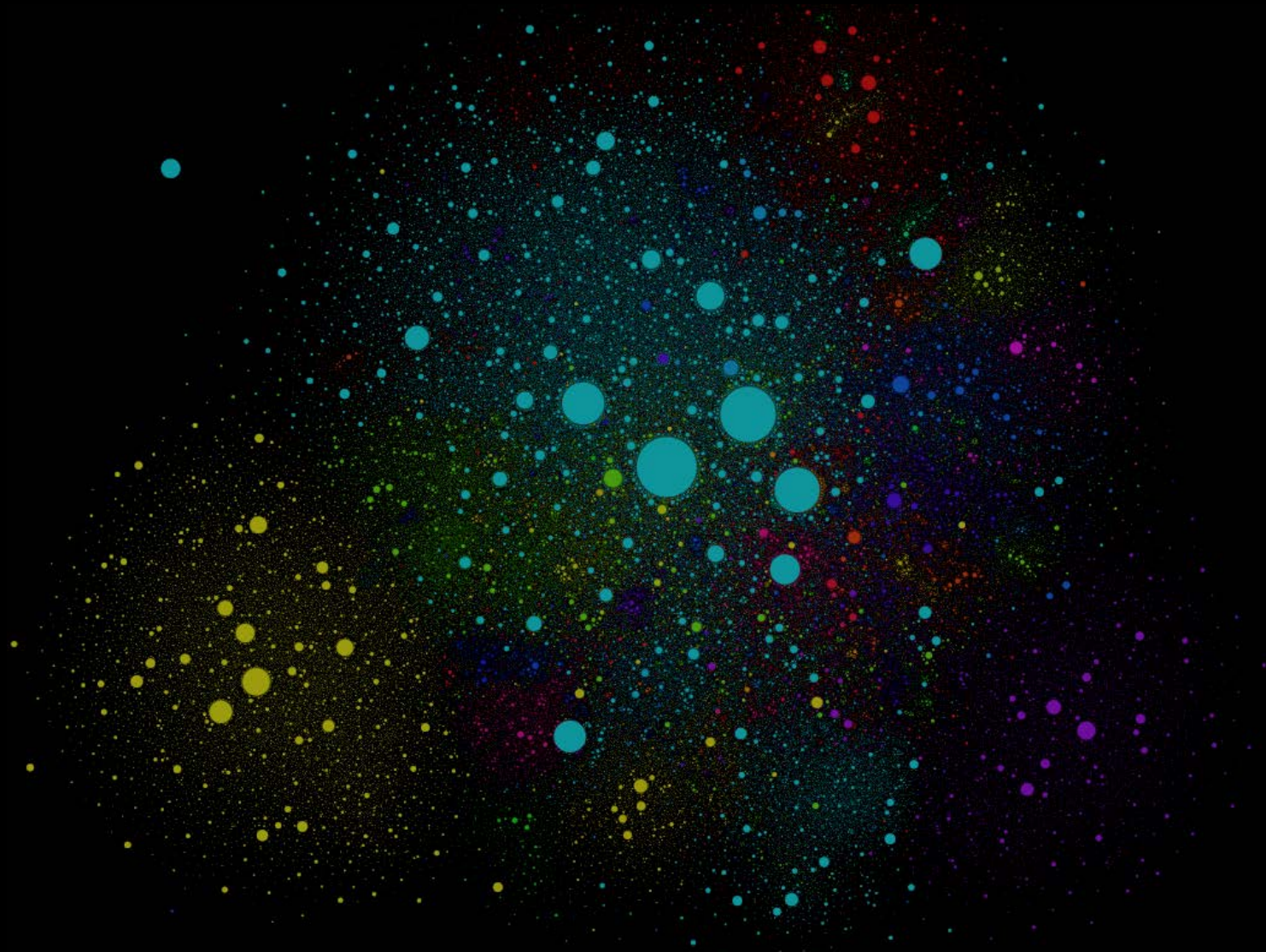
Global Flights Network. Source: [www.visualizing.org](http://www.visualizing.org), 2012





Internet Backbone: Each node represents an IP address. Source: Wikipedia



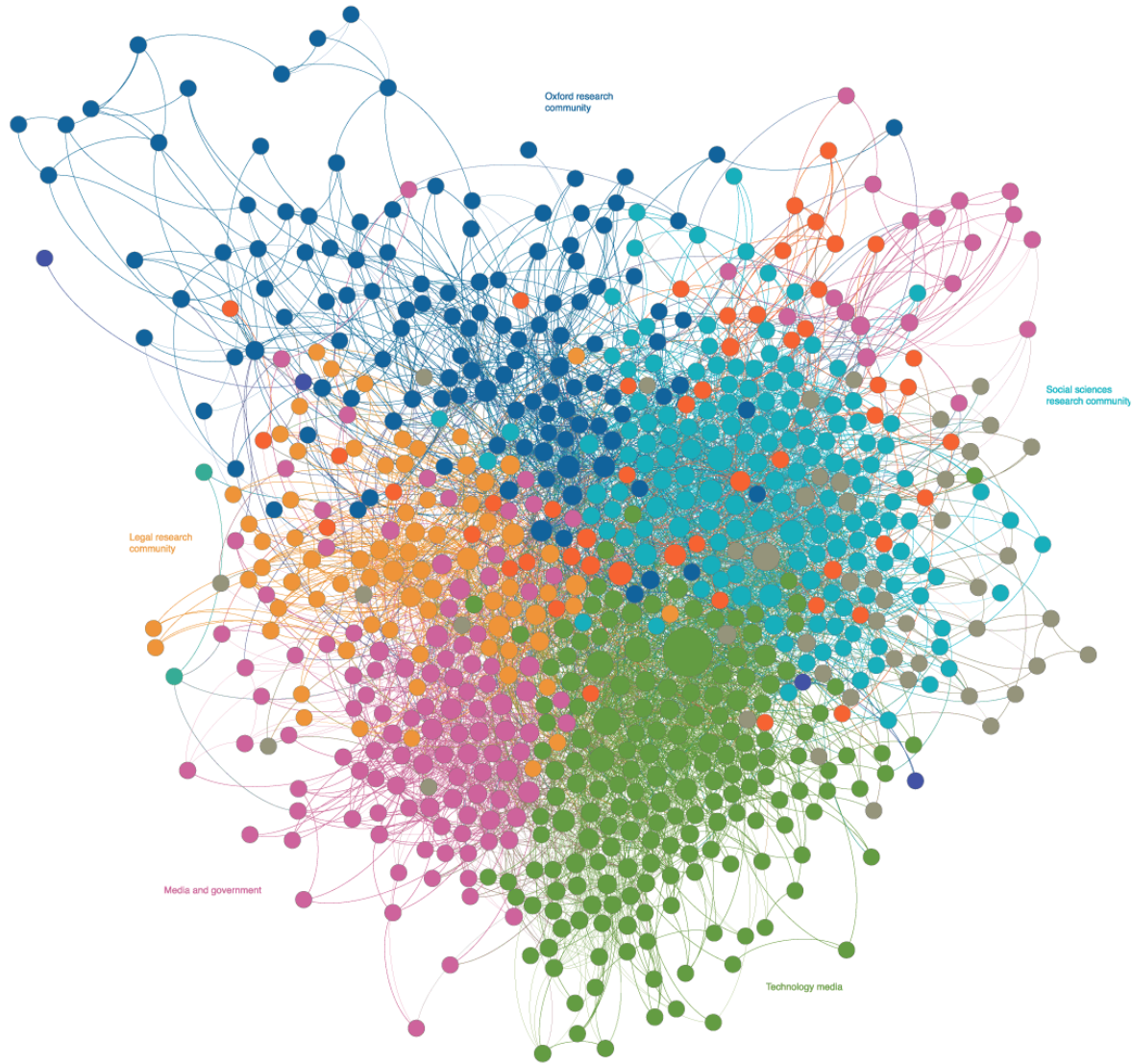


Map of the Web: Nodes represent websites. Source: [internet-map.net](http://internet-map.net)



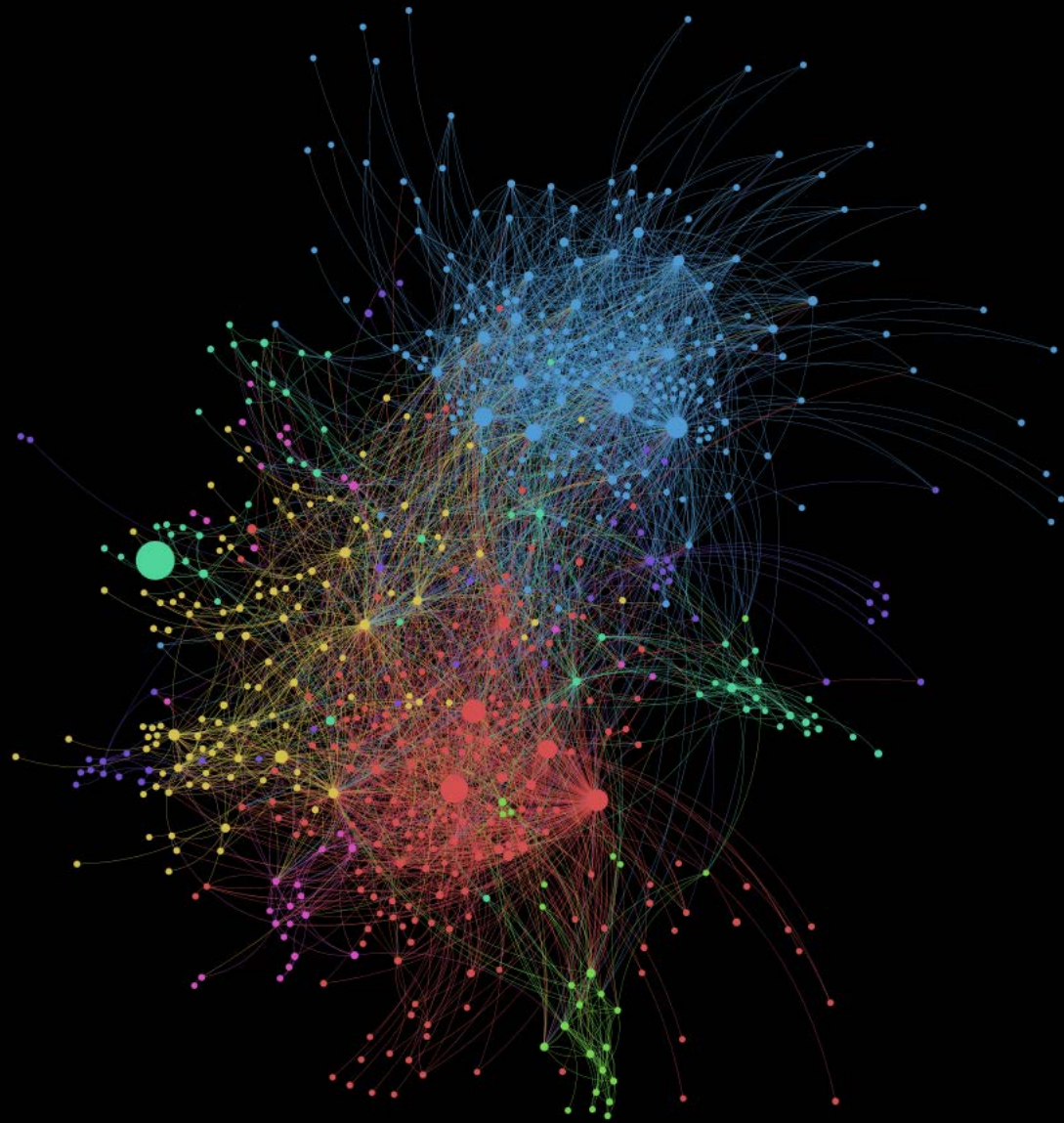


Network of Facebook friendships. Source: Facebook.com , 2010



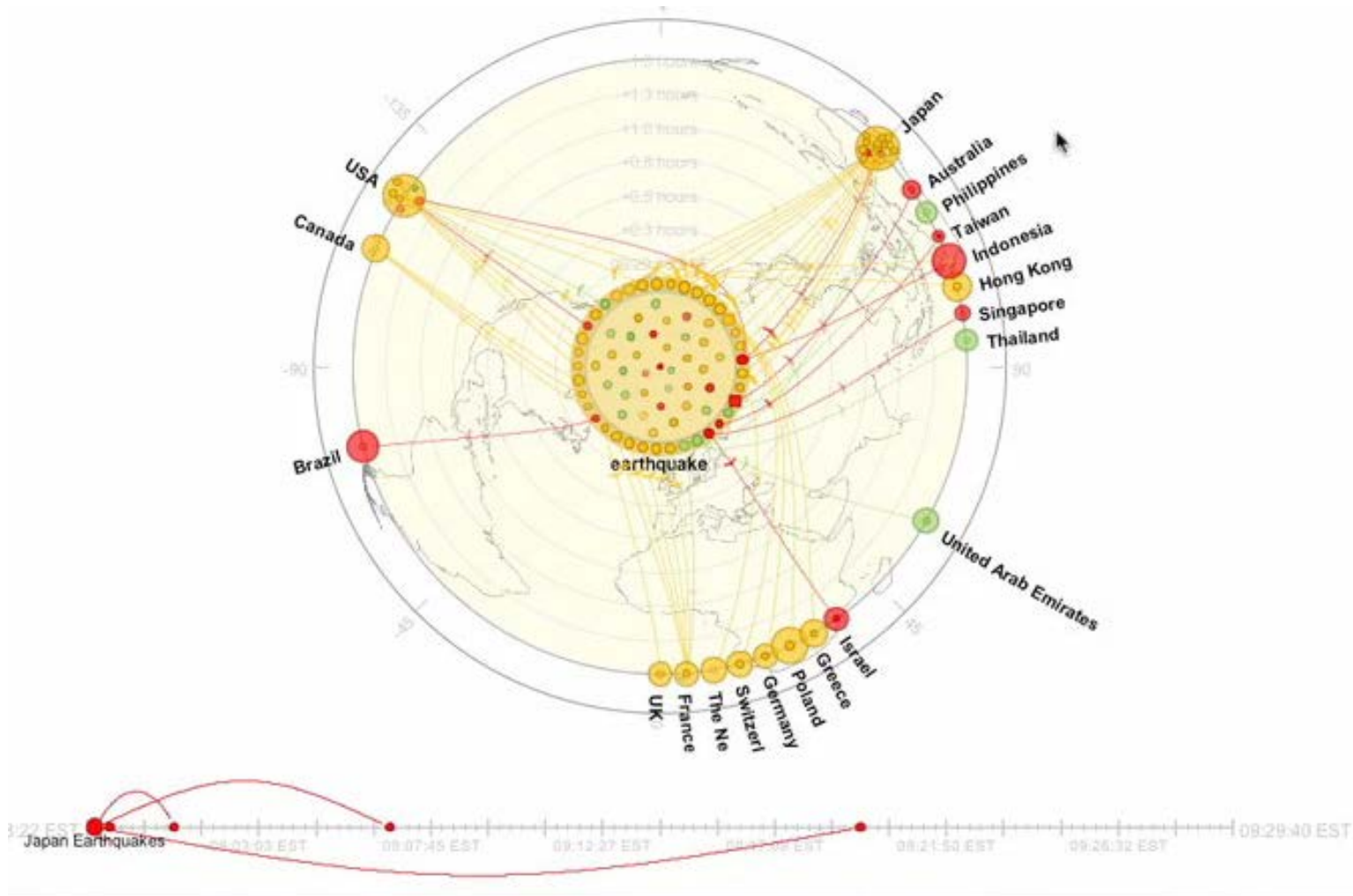
Twitter network, @OIIOxford. Source: Hogan, 2011



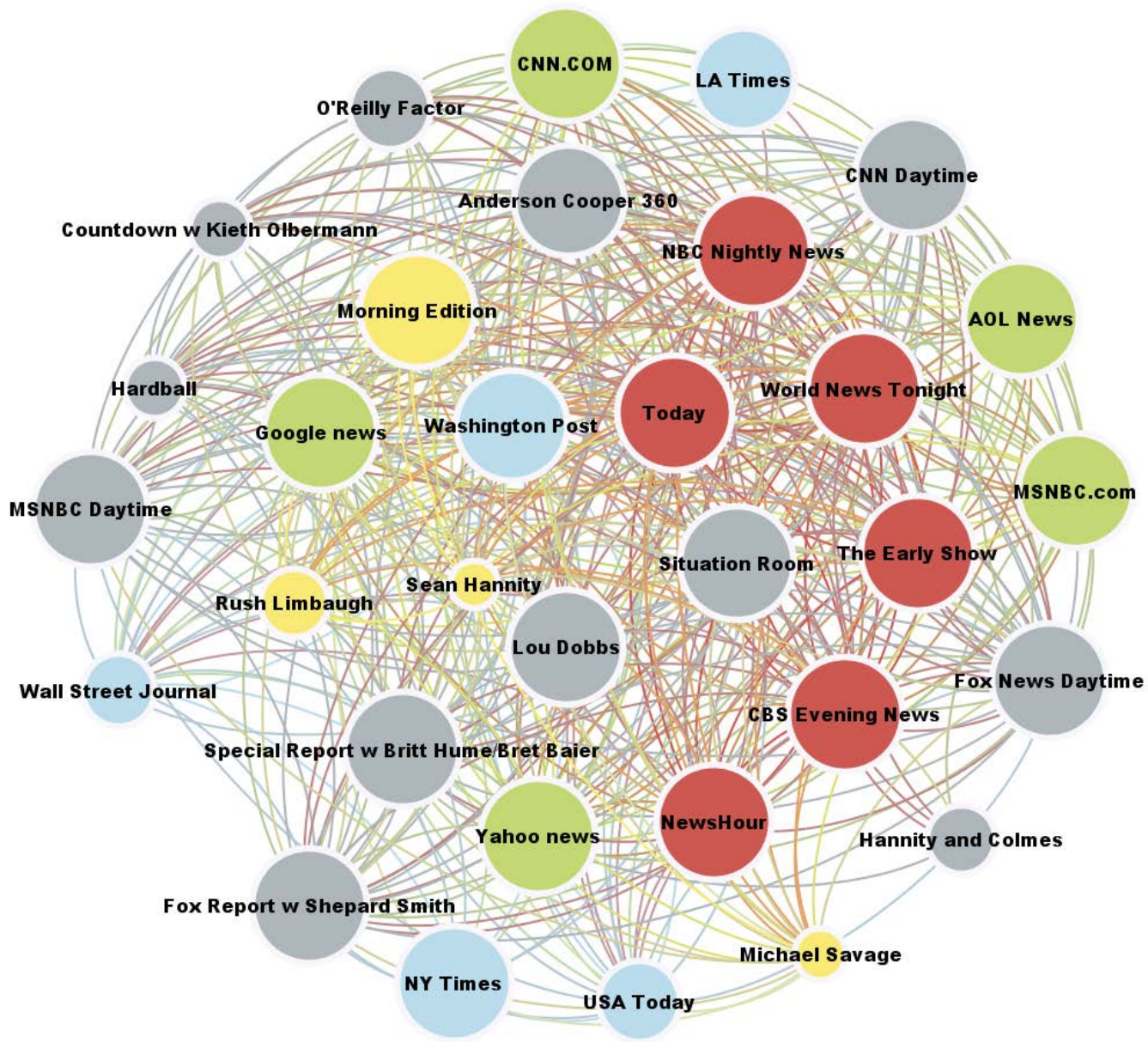


Wikipedia co-editing patterns among top editors in English. Source: Hogan, 2012



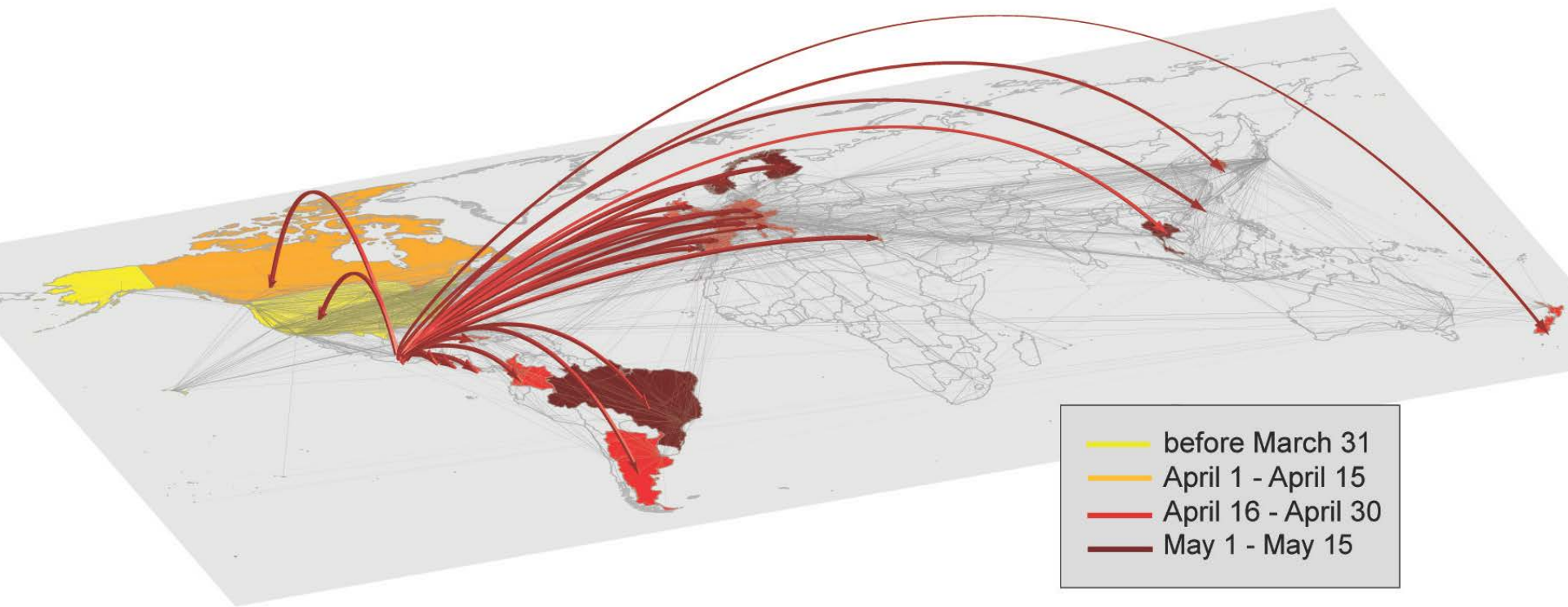


Spatiotemporal Processes of Information Diffusion. Source: Cao, Lin, Sun, Lazer, Liu, Qu (2012)

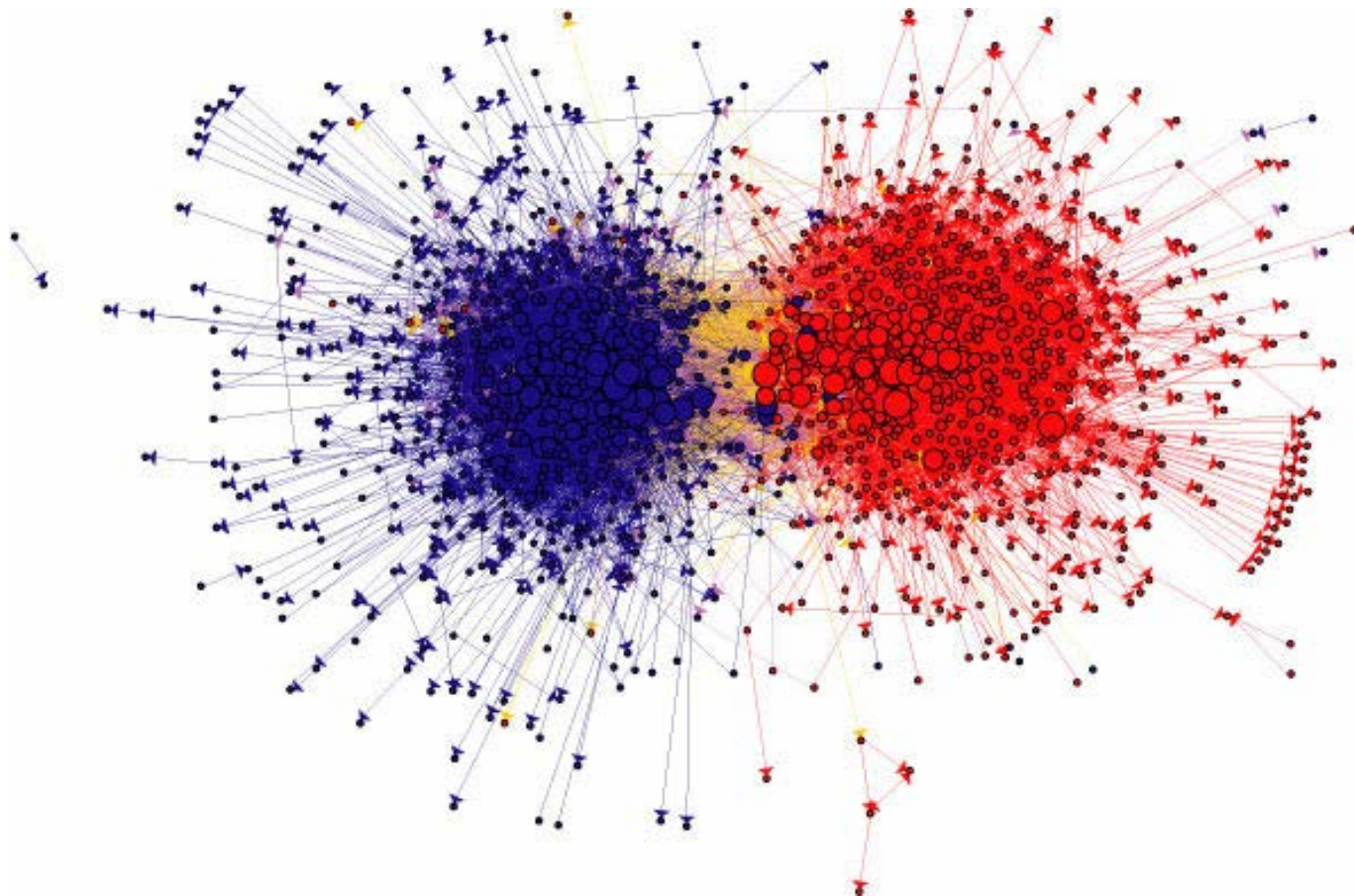


Adoption of topics in the US media system. Source: Ognyanova, 2013



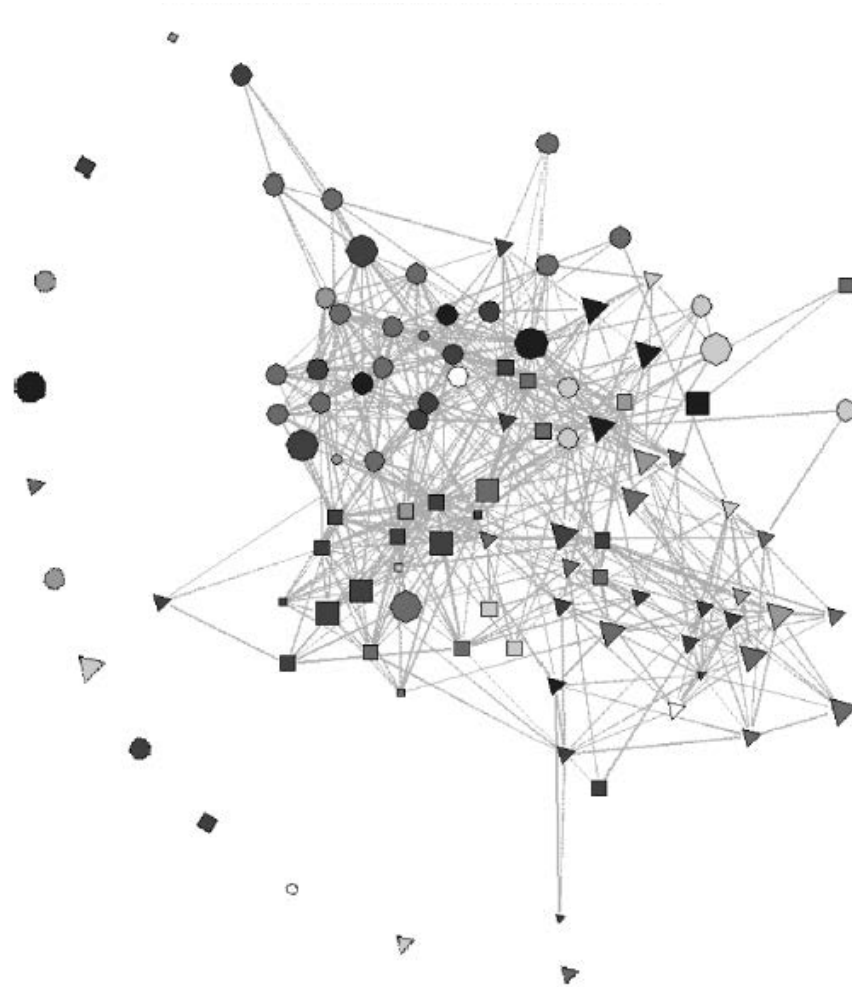


Global Spread of N1H1 and human mobility. Source: [gleamviz.org](http://gleamviz.org), 2011

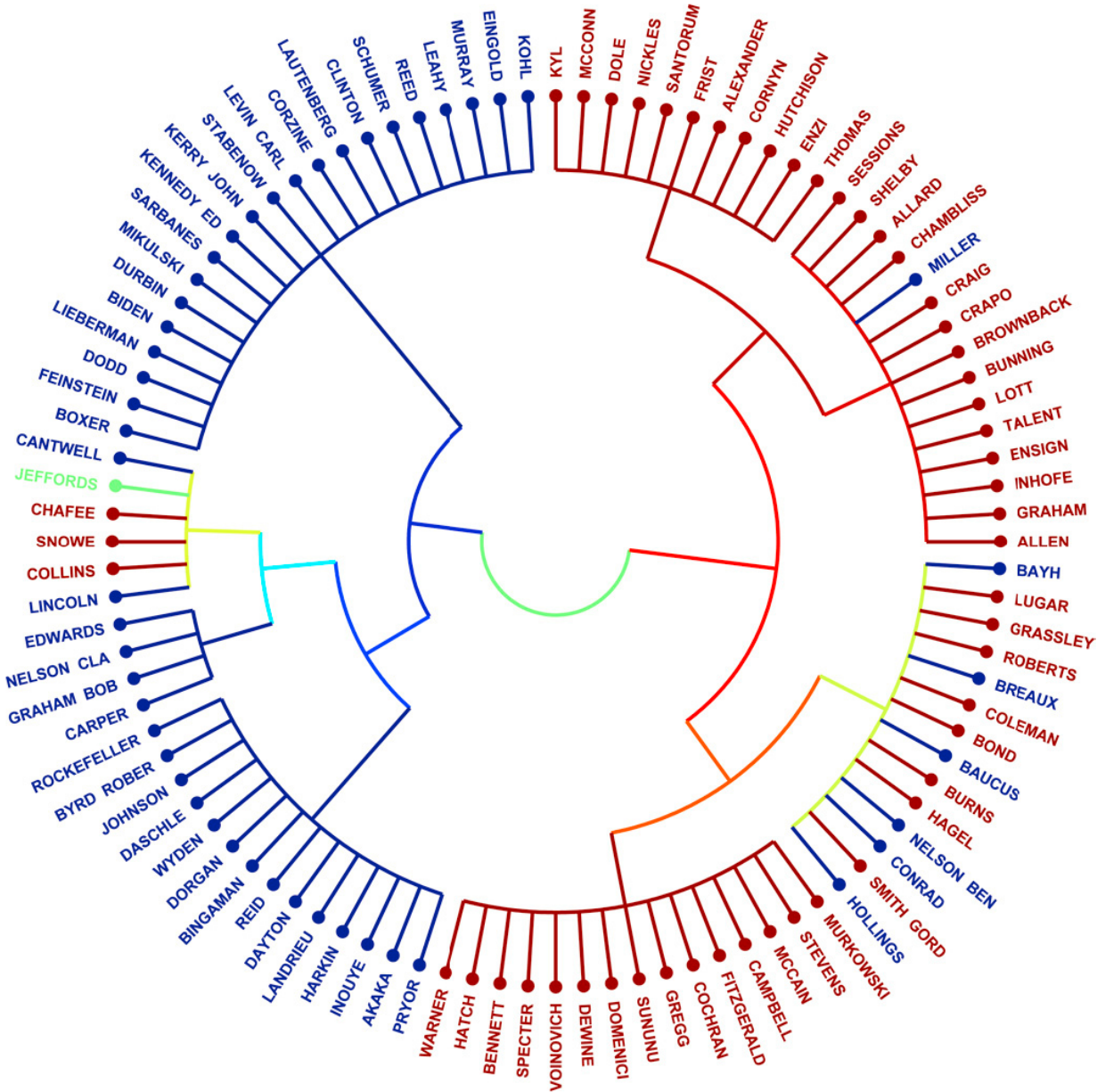


Linking patterns in the US political blogosphere. Source: Adamic & Glance, 2005





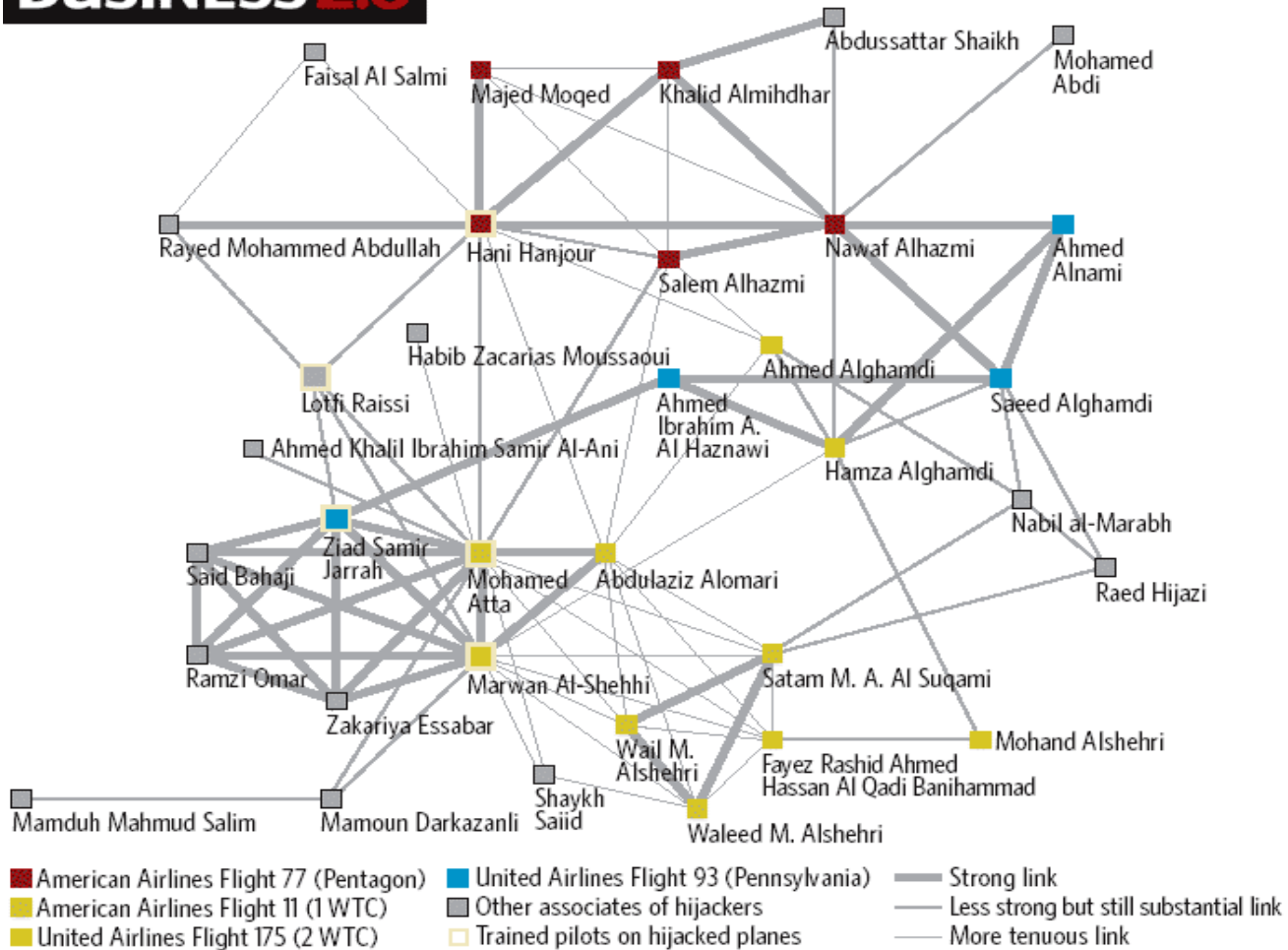
**Figure 1.** Friendship network and policy orientations of students (triangle = Section 1, square/diamond = Section 2, circle/octagon = Section 3; black = 1 [extremely liberal], white = 6 [conservative] with 4 levels of gray distinguishing intermediate values; largest = became more conservative, smallest = became more liberal, medium size = no change). For the purposes of this graph only, nodes with missing Time 3 political view are depicted as if they did not change their views (i.e., depicted as having medium size).



Congressional co-sponsorship network. Source: Zhang, Friend, Traud, Porter, Fowler, Mucha (2008)



# BUSINESS 2.0



Terrorism Network. Source: Business 2.0, December 2001. *Six Degrees of Mohamed Atta*

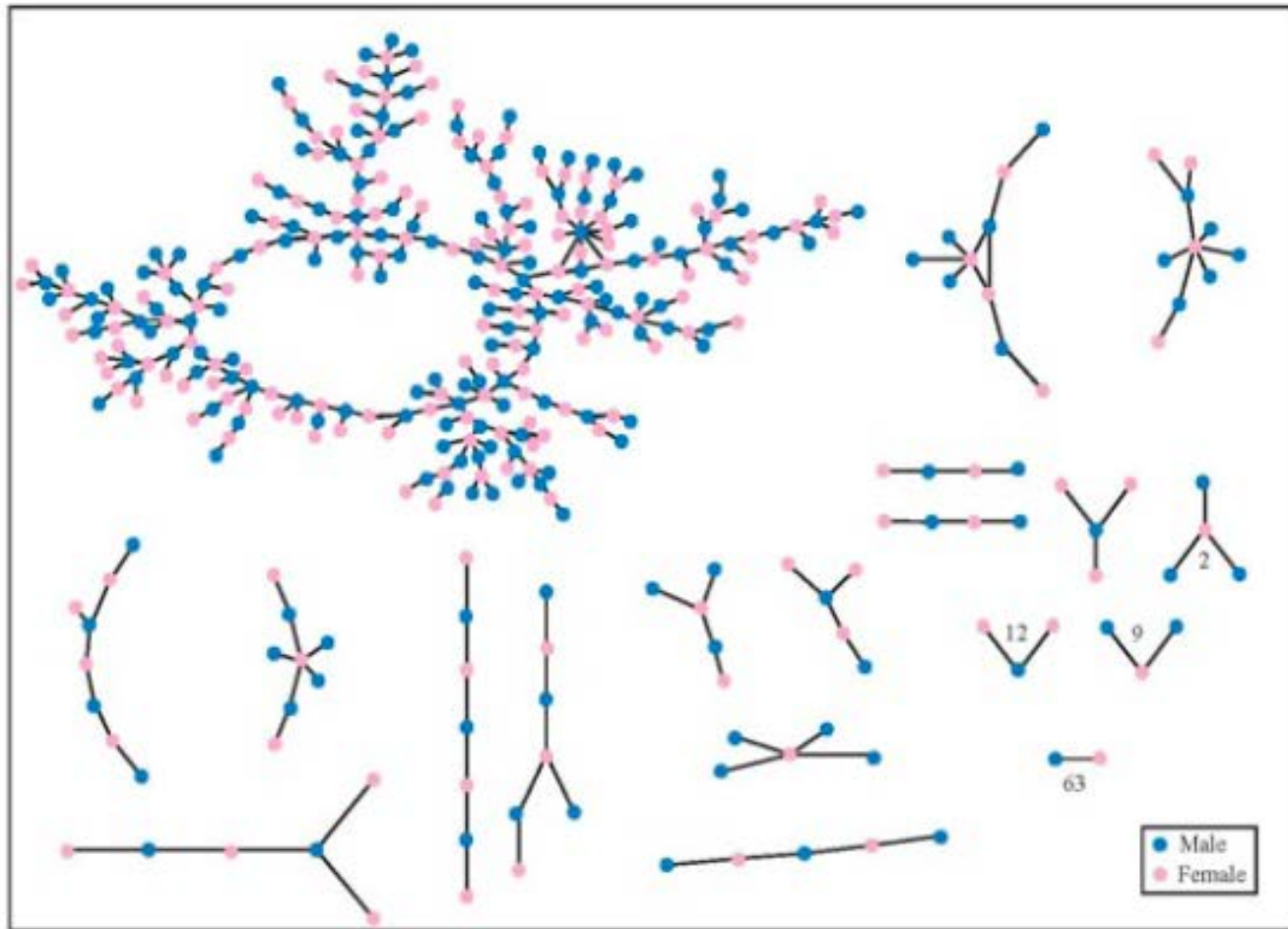
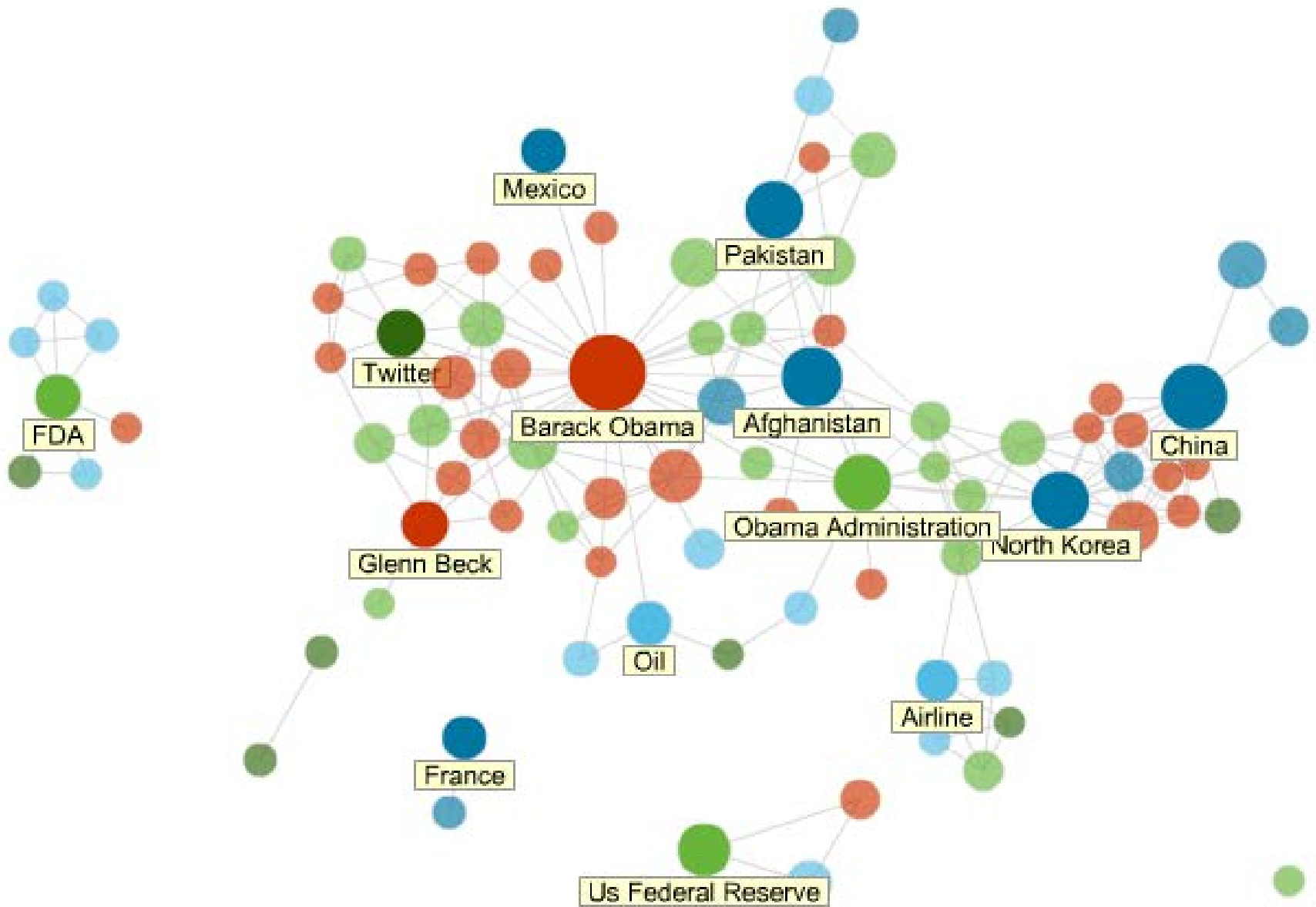


Figure 2.7: A network in which the nodes are students in a large American high school, and an edge joins two who had a romantic relationship at some point during the 18-month period in which the study was conducted [50].



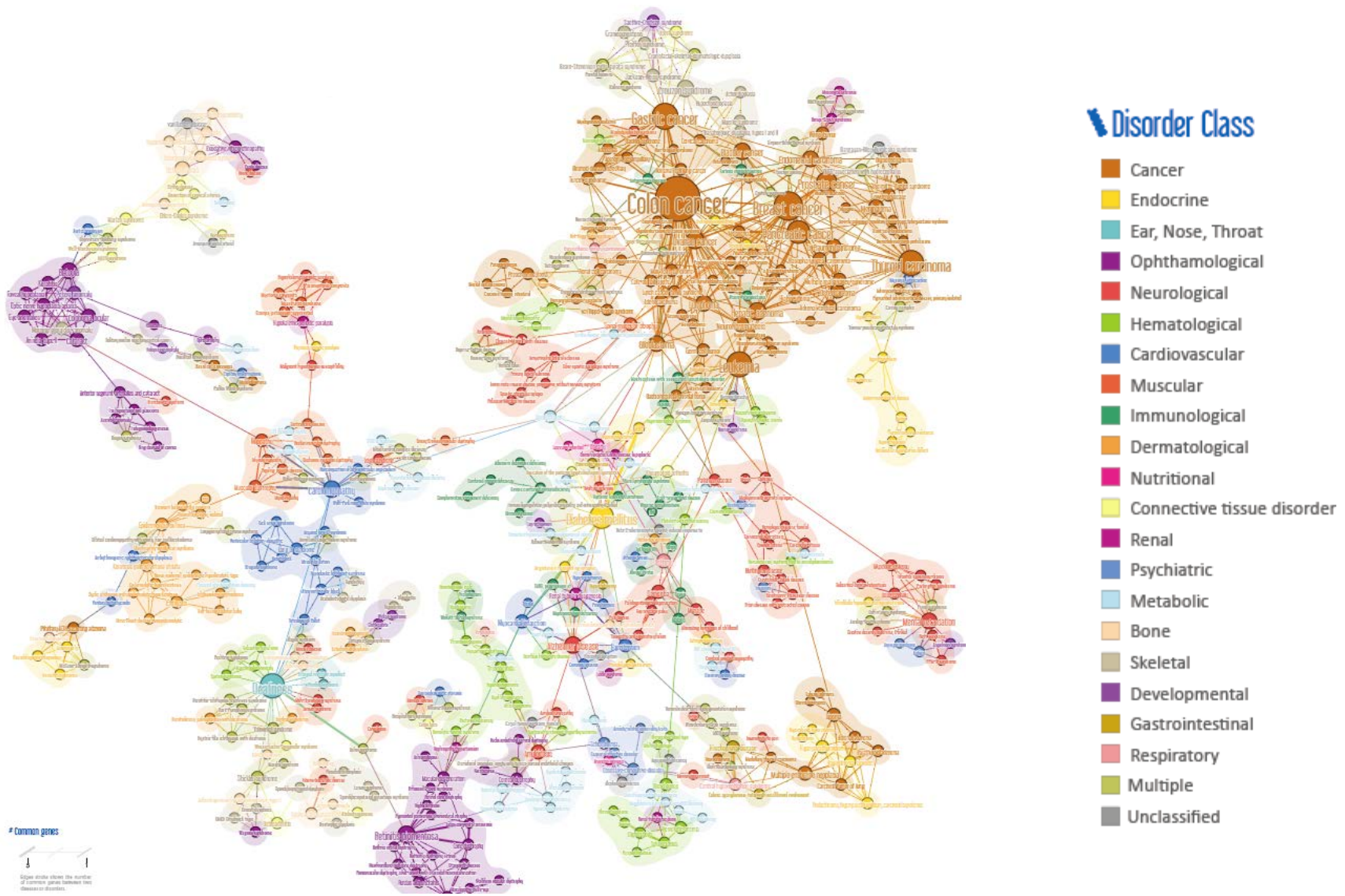




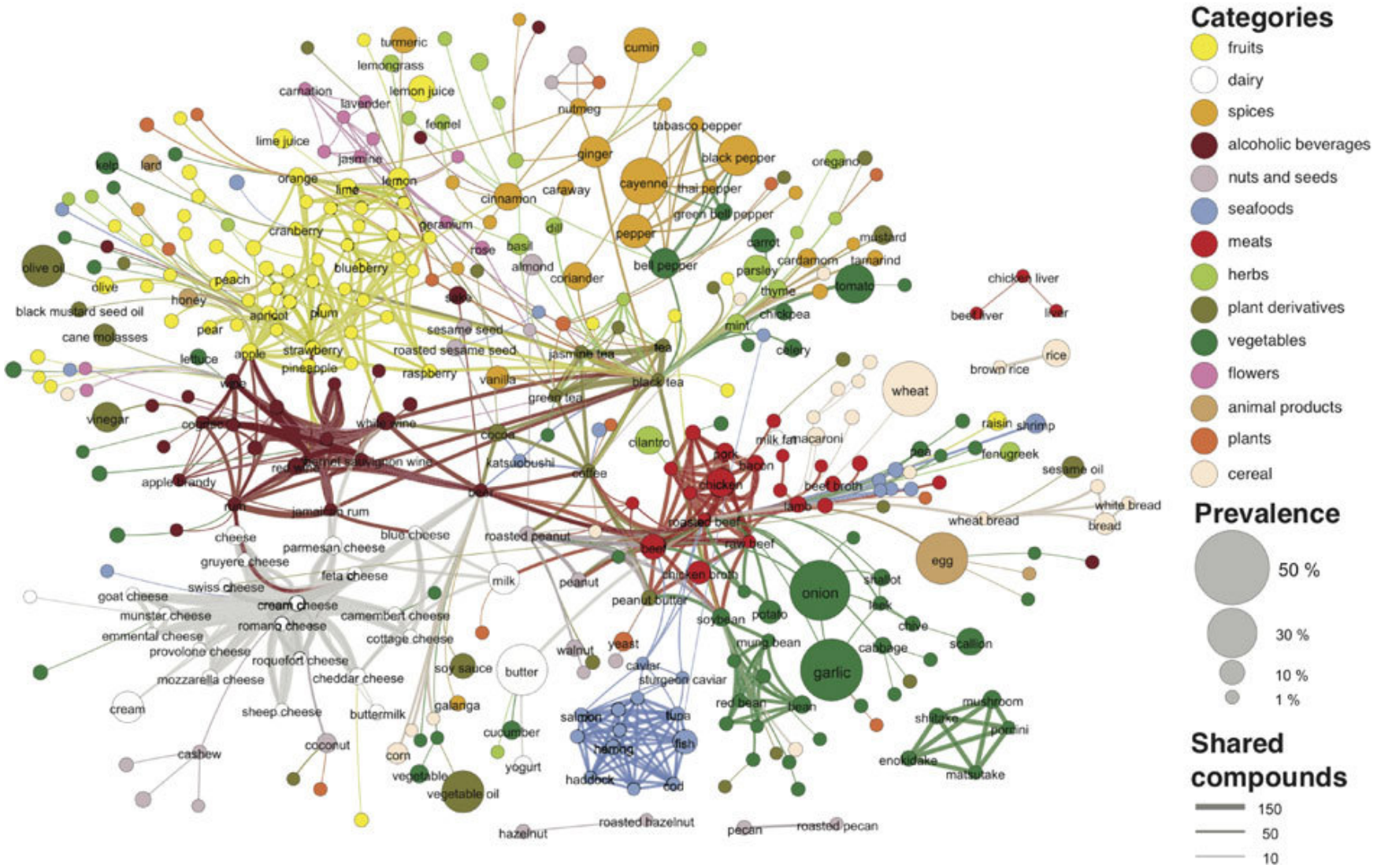
Network of news topics. Source: Slate News Dots, 2010







Disease network: phenotype and disease gene associations. Source: Diseasesome.eu, 2013



Flavor network and the principles of food preparing. Source: Ahn, Ahnert, Bagrow & Barabasi , 2012

What do **network formats** look like?



# A few **network types** you will meet in the wild

## Binary



- **Link or no link** (1 or 0)

## Signed



- **Positive or negative** (+, - or 0)

## Valued



- **Weighted links** (each link is assigned a value)

## Symmetric



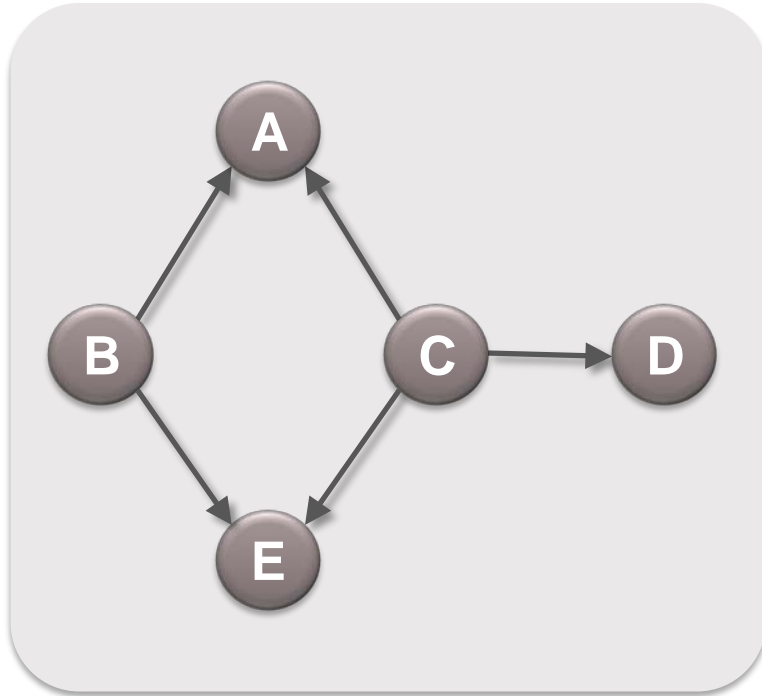
- **Directed vs. undirected** (undirected = symmetric)

## Multiplex



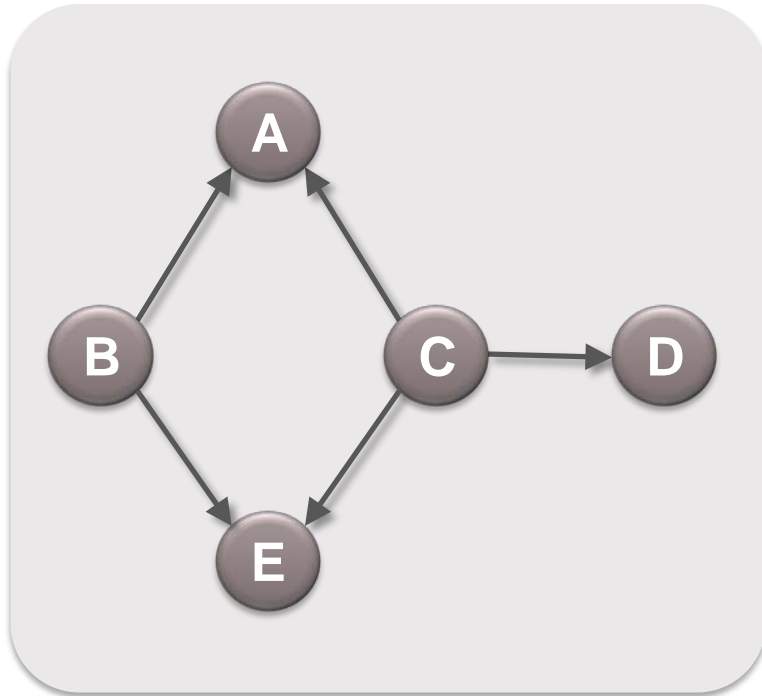
- **Multiplex** (more than one link type)

# Network formats: **the Matrix**



	A	B	C	D	E
A	0	0	0	0	0
B	1	0	0	0	1
C	1	0	0	1	1
D	0	0	0	0	0
E	0	0	0	0	0

# Network formats: **the Edgelist**



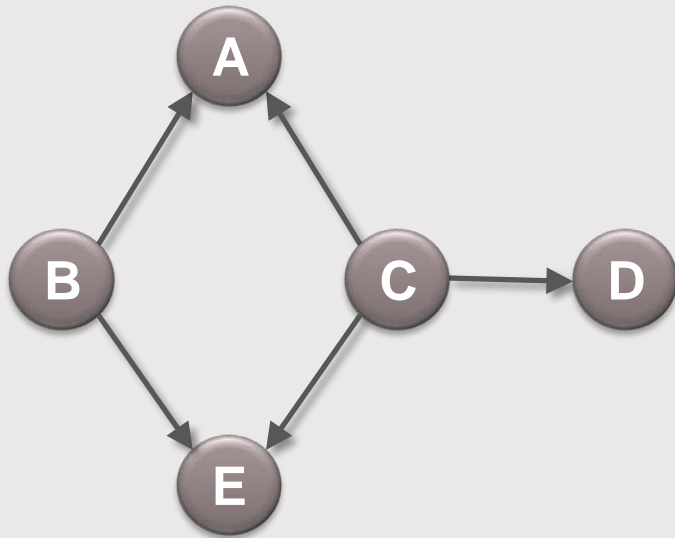
## Source Destination Weight

B	A	1
B	E	1
C	A	1
C	E	1
C	D	1

Note: Weights are optional.



# Network formats: **the Nodelist**



## Source Destinations

B A E

C A D E

# Frequently used **network** file **formats**

- **GEXF (Graph Exchange XML Format)**

- **GraphML, another XML format for graphs**

- **GML (Graph Modelling Language)**

- **DL, edgelist & matrix formats used by UCINET**

- **Net and Paj, Pajek network and project files**

- **Larger Nets: Graph Databases (Titan, Neo4j, etc.)**

**Coming up next**

**Visualizing networks with Gephi**

**[www.gephi.org](http://www.gephi.org)**

**Download this presentation & supporting files**

**[kateto.net/NULab-Gephi](http://kateto.net/NULab-Gephi)**



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