



Social Networks and Social Network Analysis

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What Are Social Networks?

Humans are social

Peoples' relationships

- Family and friends
- Work, advise and mentorship
- Enemies and frenemies
- Sharing and support
- Resources
- Flows (money, information, others)

Entities and connections

- World trade (e.g., oil, money)
- Corporate partnerships
- Conflict



Background

Graph Theory from Mathematics

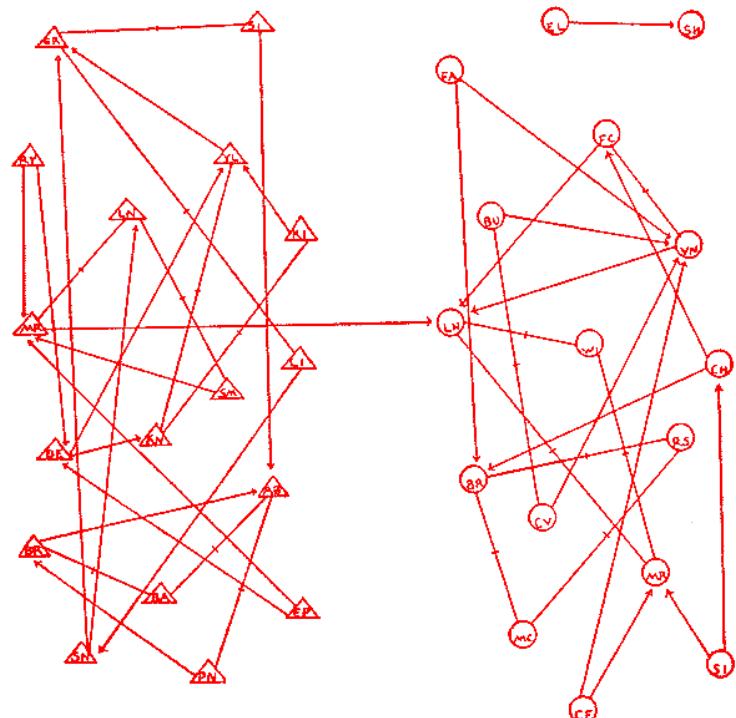
- Leonhard Euler, 1736
- Seven Bridges of Königsberg
- Vertices and edges

1800s Sociologists

- Georg Simmel and Émile Durkheim
- Patterns of relationships

1930s Sociograms

- Jacob L. Moreno



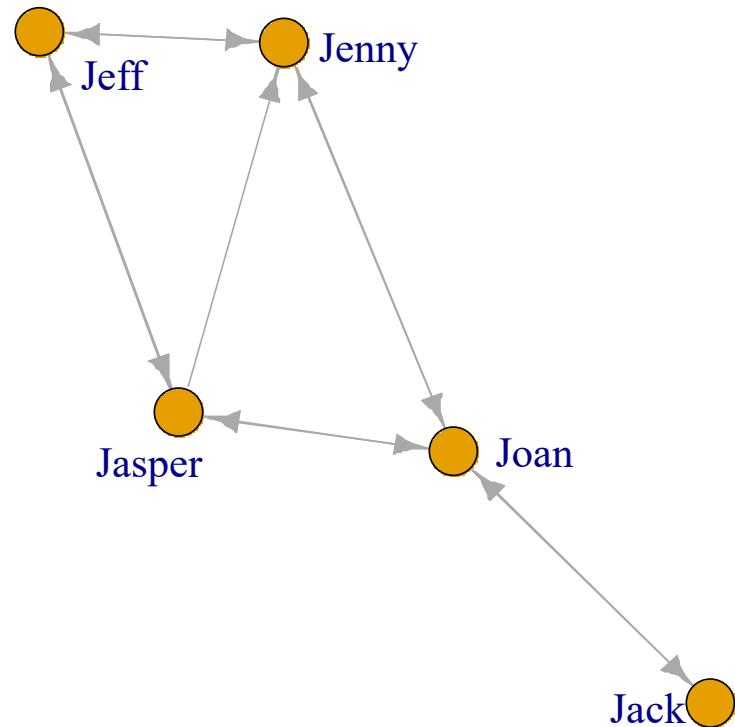
Today



Representing a Social Network

Matrix (directed)

	Jeff	Joan	Jenny	Jasper	Jack
Jeff	?	0	1	1	0
Joan	0	?	1	1	1
Jenny	1	1	?	0	0
Jasper	1	1	1	?	0
Jack	0	1	0	0	?



Representing a Social Network

Linked List

Jeff,Jenny

Jeff,Jasper

Joan,Jenny

Joan,Jasper

Joan,Jack

Jenny,Jeff

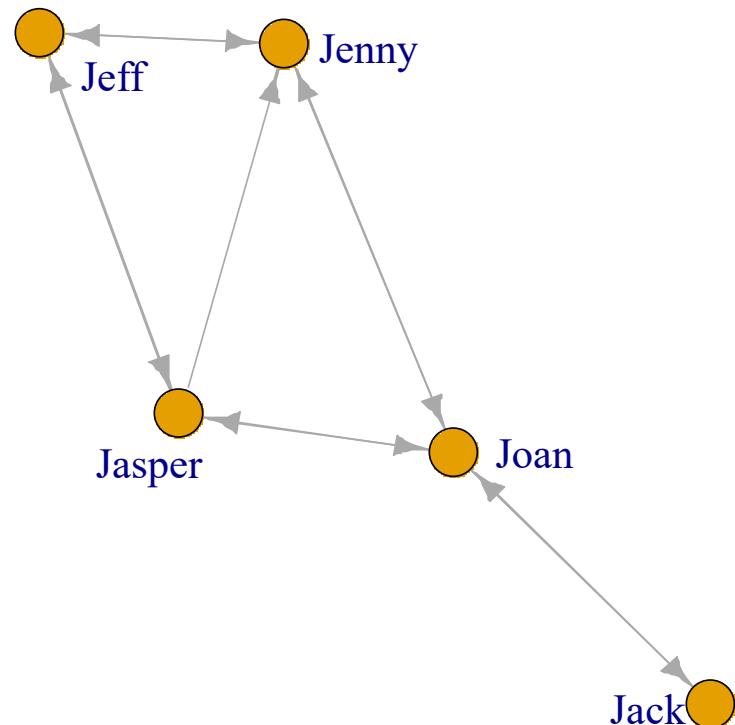
Jenny,Joan

Jasper,Jeff

Jasper,Joan

Jasper,Jenny

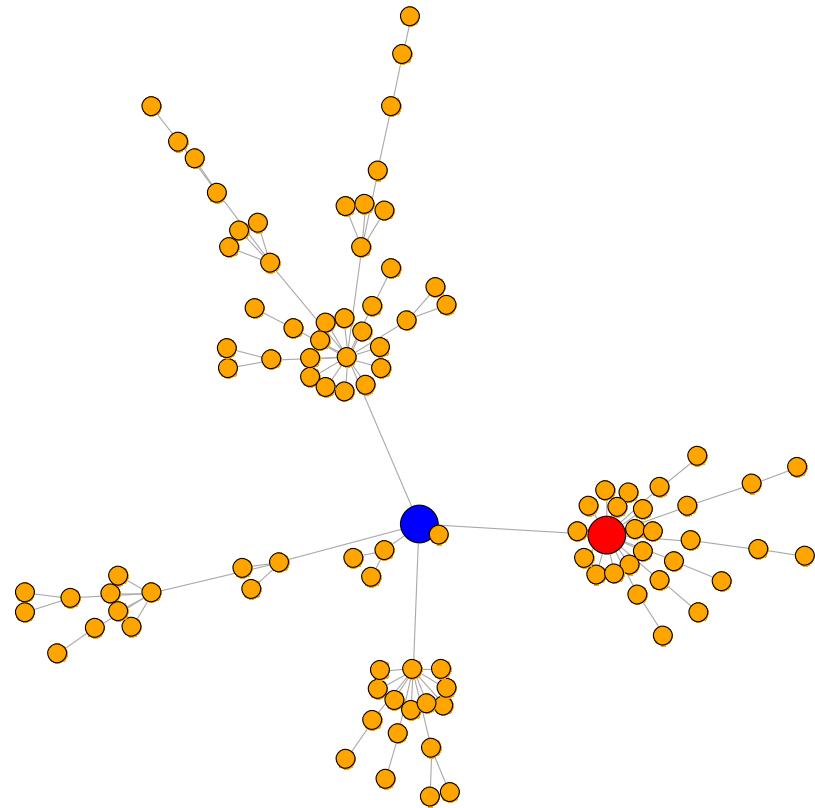
Jack,Joan



Who Is the Most “Important”?

Centrality

- Degree (blue)
 - in / out
- Betweenness
- Closeness
- Eigenvector

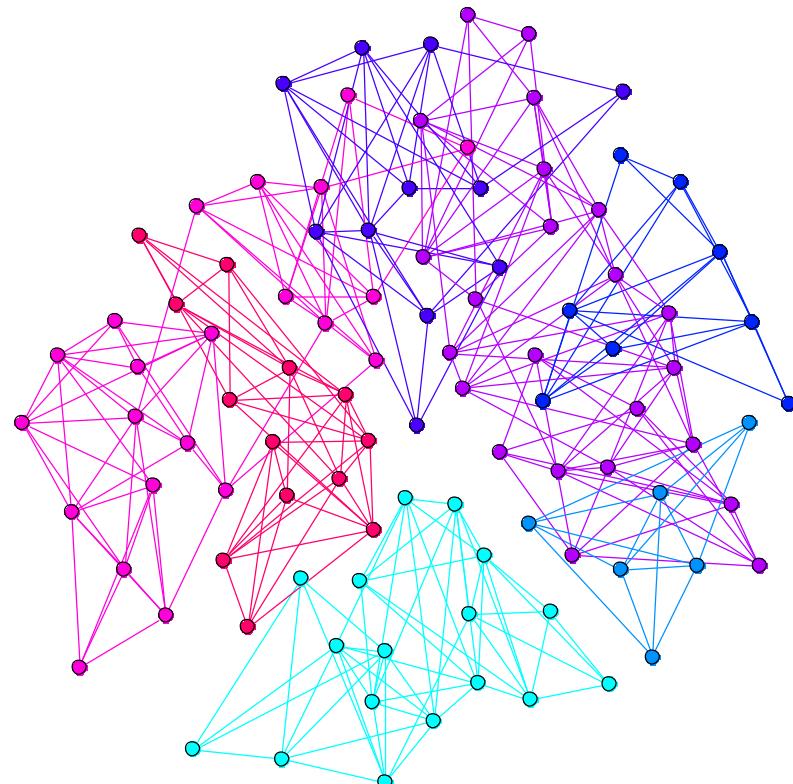


Network Structure

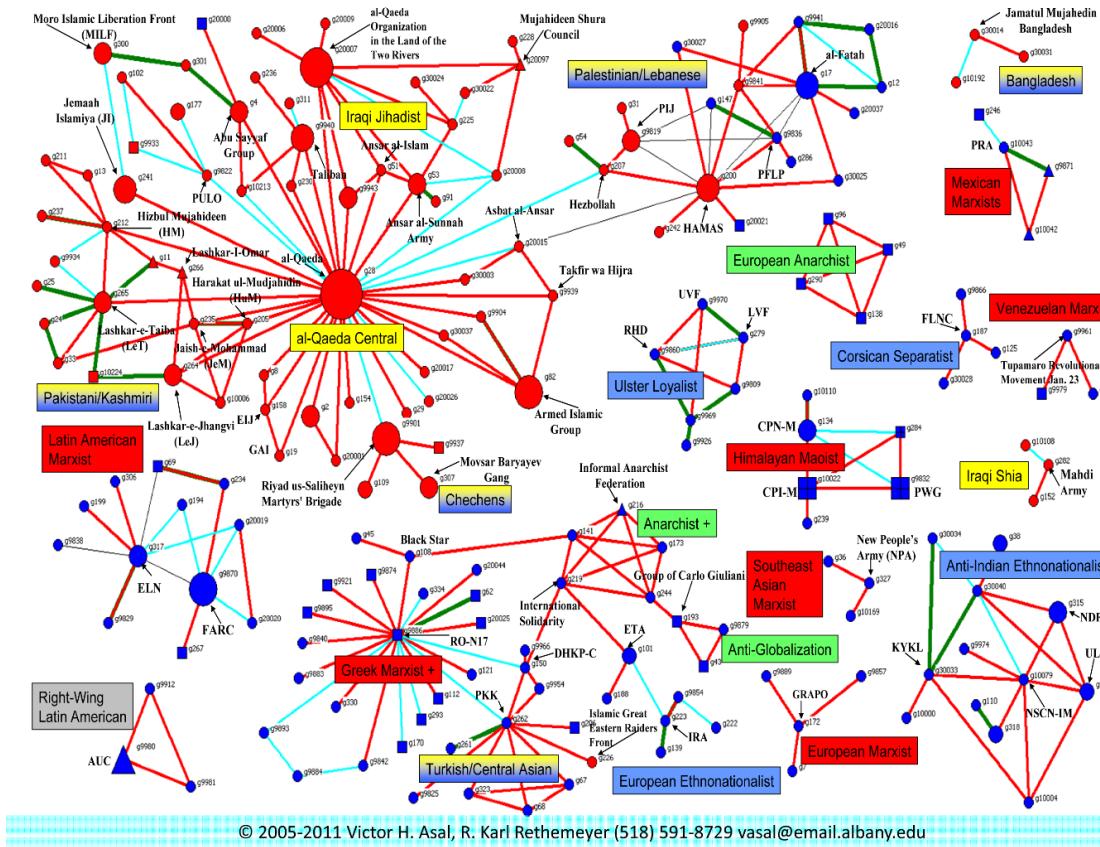
Clusters

Holes

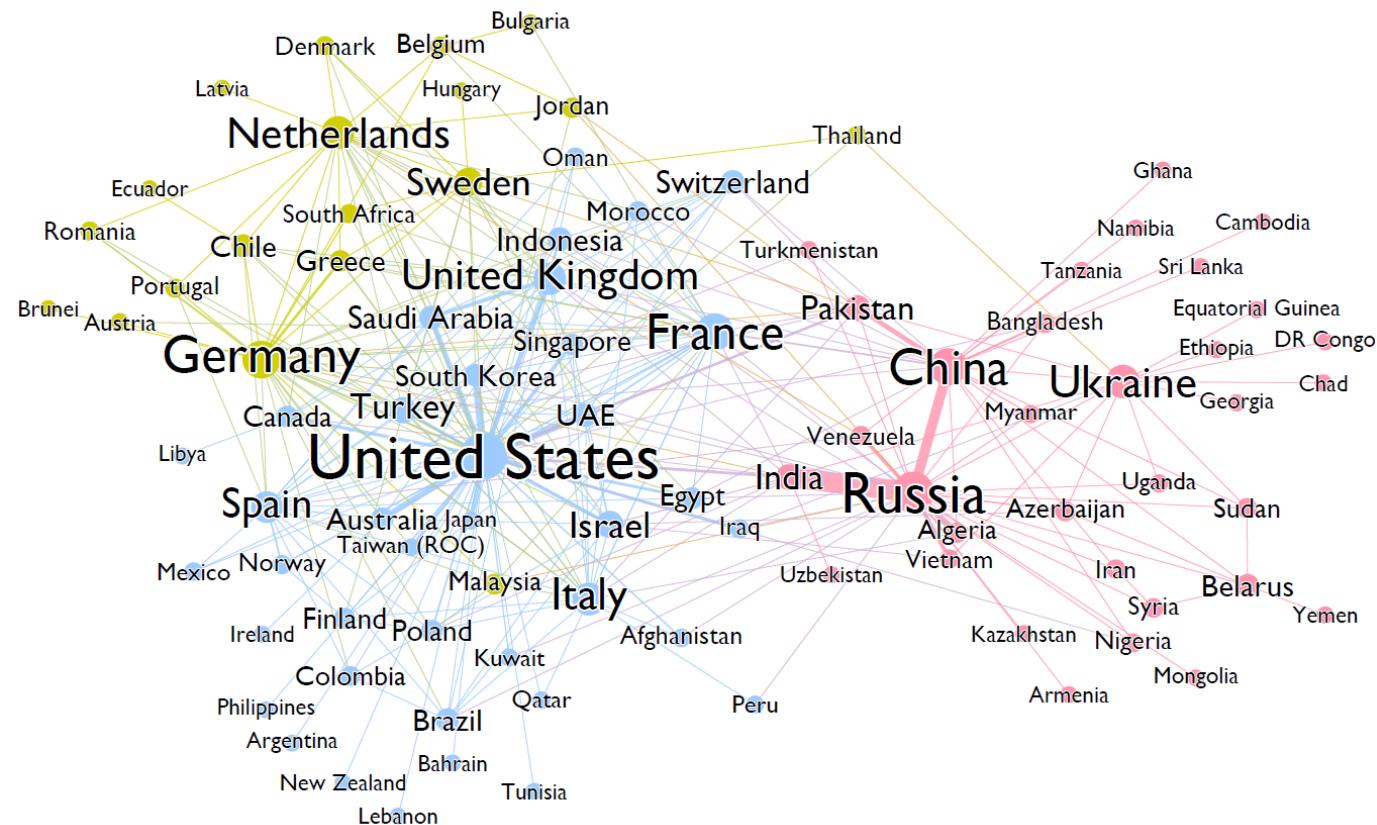
Core and Periphery



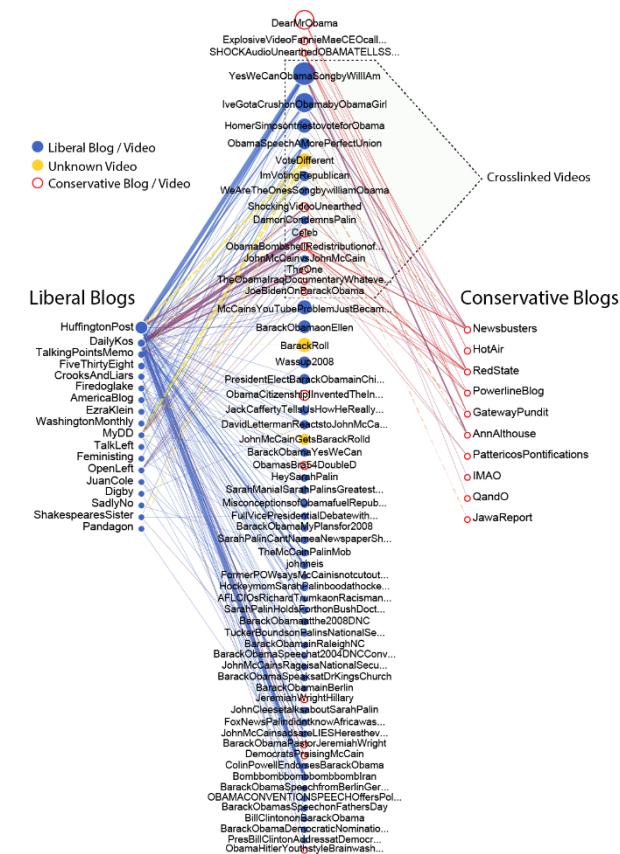
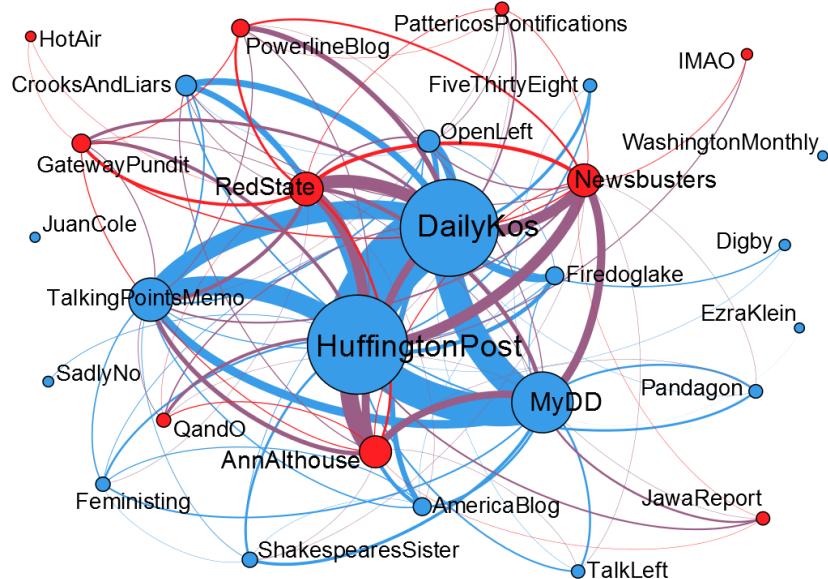
Terrorist Networks



Global Weapons Sales



Blogs and Videos



Twitter Activists

