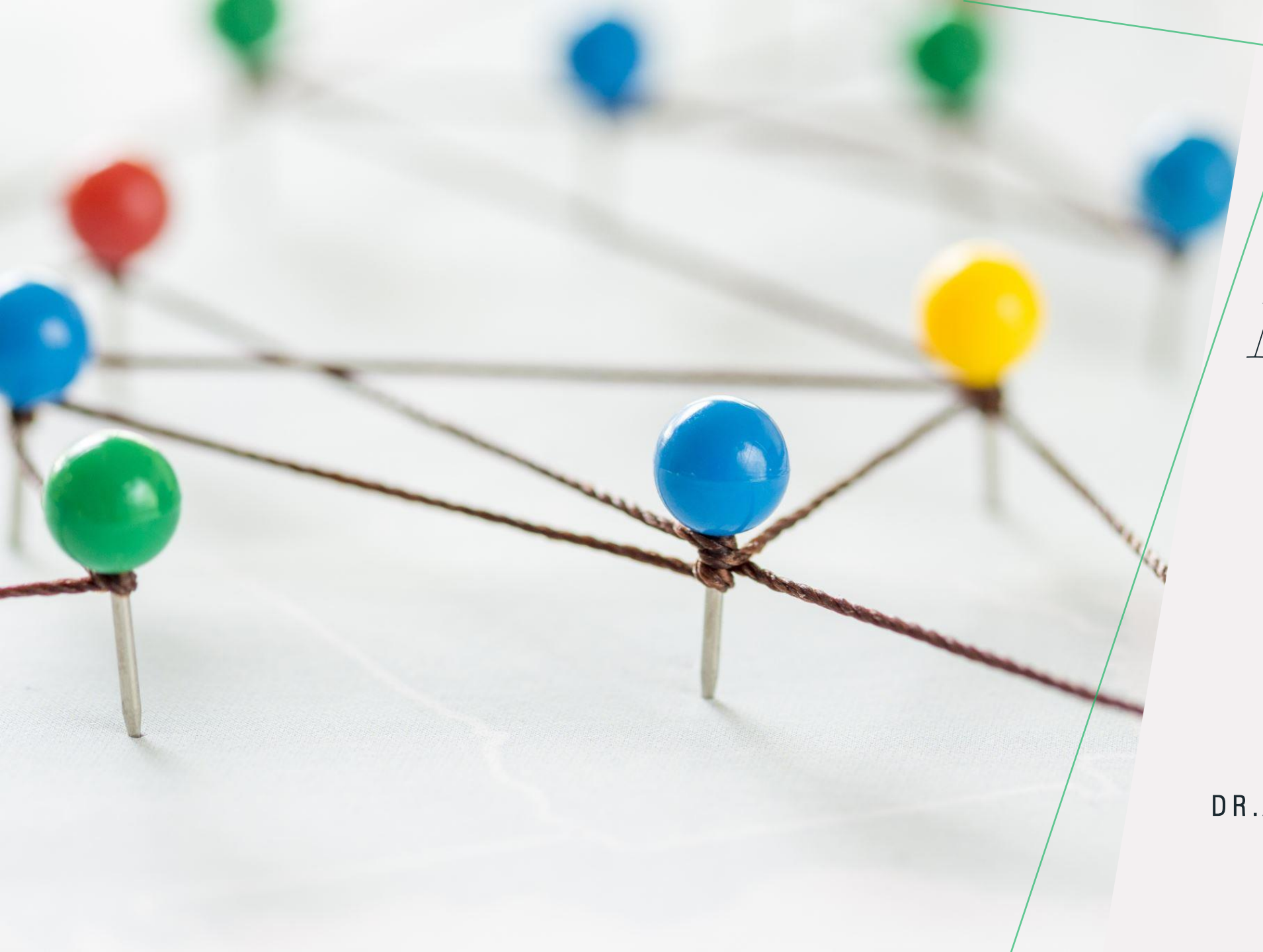


# *SOCIAL NETWORK ANALYSIS*

Mphil DataScience
Course No.

COURSE INSTRUCTOR:

DR.ARJUMAND BANO SOOMRO

# *INTRODUCTION*

- Jacob L. Moreno (Social Scientist)
- Present the Sociometry and SNA
- The perspective was introduced century ago but the evolution has occurred in data analysis due to the advent of computer technology, due to which Data retrieval, storing, and analysis have become easier and more efficient, also access to relational data

# *SOCIOMETRY*

- Sociometry is a quantitative method for analyzing and measuring social relationships and interpersonal interactions within groups.
- It focuses on understanding the dynamics of group structures, including patterns of attraction, repulsion, and neutrality among members.
- This method is widely utilized in social psychology, sociology, social anthropology, and psychiatry to study group cohesion, hierarchies, and the influence of social networks on individual and collective behaviors.
- By using tools such as sociograms and surveys, sociometry provides insights into social connectivity, helping to identify leaders, isolates, subgroups, and the overall emotional climate within a group.

# *SOCIAL NETWORKS*

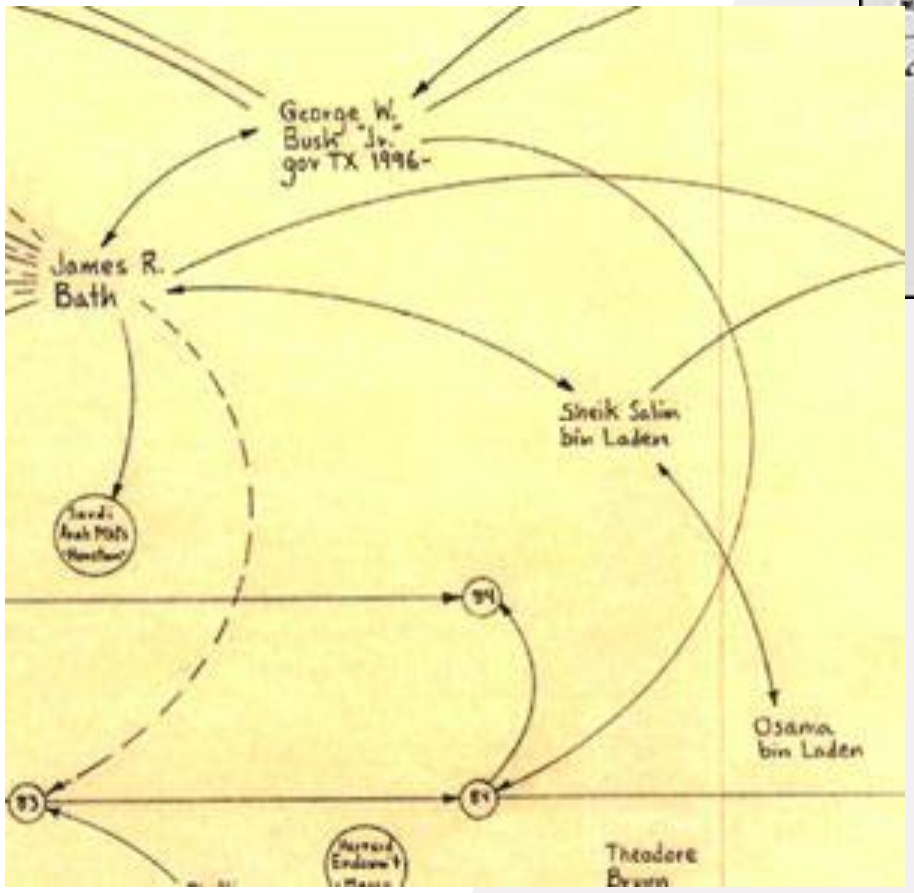
- The nature of a social network encompasses the fundamental traits and dynamics of relationships, interactions, and structures among individuals, organizations, or entities. These networks are commonly analyzed in sociology, communication, and technology.
- Key attributes:
  - **Connectivity:** The degree to which individuals are connected within the network.
  - **Density:** The proportion of actual connections compared to possible connections.
  - **Homophily:** The tendency of individuals to associate with similar others.
  - **Centrality:** The influence or importance of certain individuals within the network.

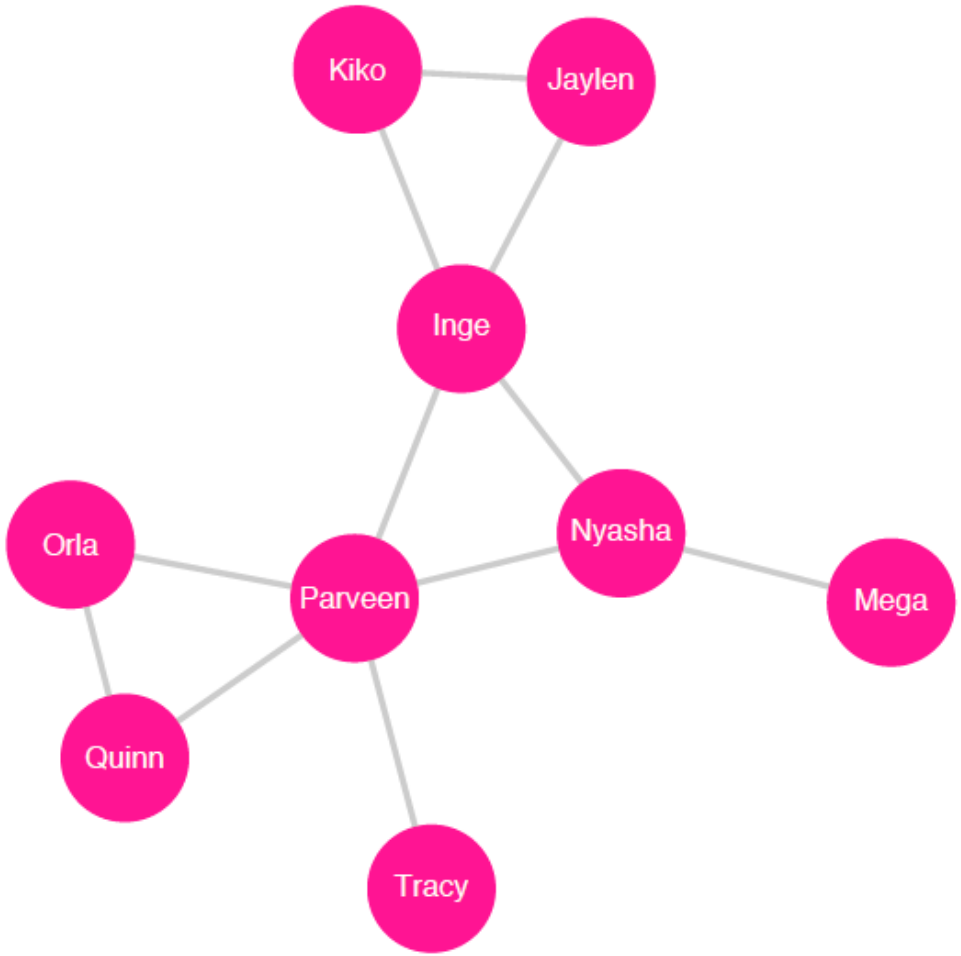
# *EXAMPLES*

- Personal and Community-Based Social Networks (e.g.family, friends..)
- Professional Social Networks (e.g. colleagues, teams, work groups…)
- Digital and Online Social Networks (e.g. FB, ..)
- Academic and Educational Networks (e.g. Alumini, societies, clubs…)
- Economic and Business Networks (e.g. Customers/consumers, supply chain,…)
- …more

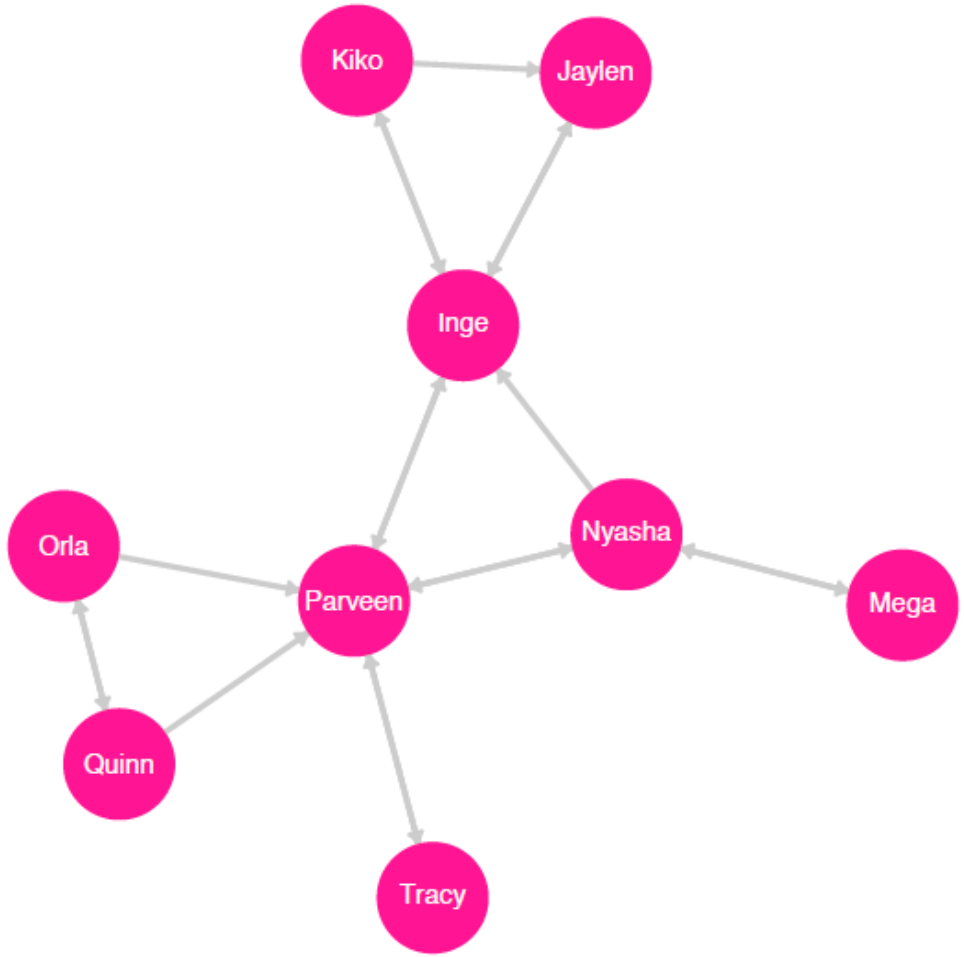
# *POLITICAL/FINANCIAL NETWORKS*

Mark Lombardi: tracked and mapped global financial fiascos in the 1980s and 1990s from public sources such as news articles

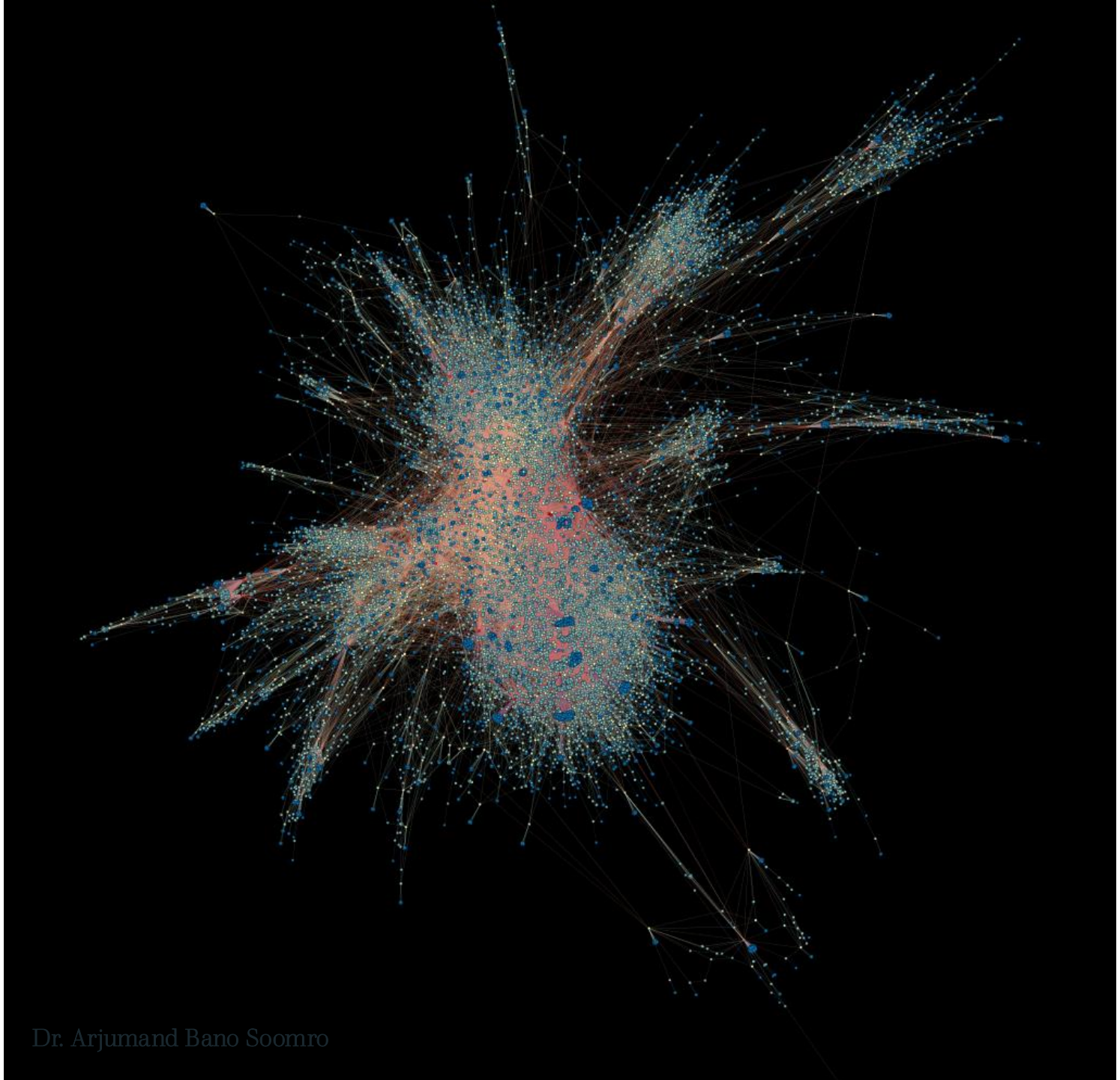





(a) An undirected friendship network of students in an elementary school class as inferred by the teacher.

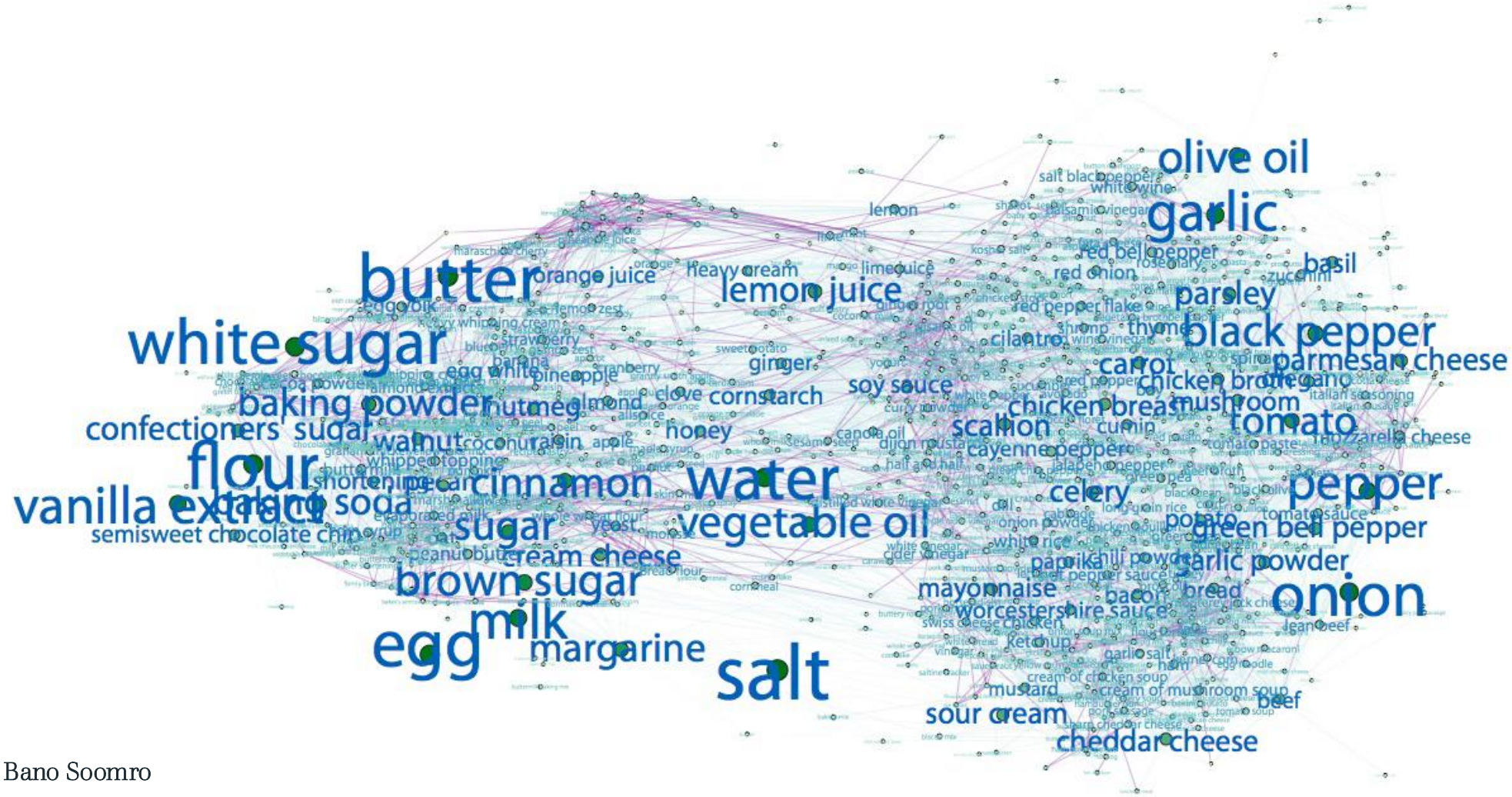



(b) A directed friendship network of students based on self-reported ties.



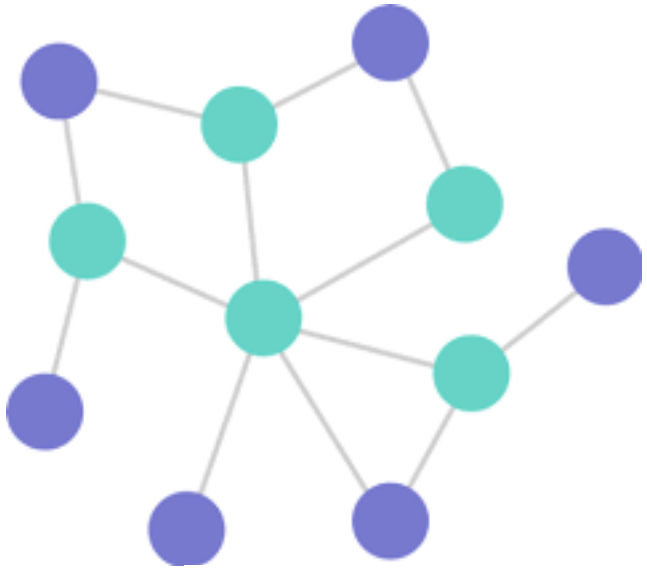
# *THE INTERNET*

# INGREDIENT NETWORK



# *CHANGE IN PERSPECTIVE....*

- Data Collection and Data Analysis
  - Earlier was qualitative
  - Now, quantitative is dominating due to computer technology and the Internet
  - Recently Qualitative Data Analysis has returned, with a Mixed Methods Approach
  - The analysis in SNA is different. It focuses on relations and structures, a change in perspective when observing the world around us that impacted the investigation of the problem.
  - The Observations in SNA are considered interdependent (influencing each other).



# NETWORKS

- Networks are sets of nodes connected by edges.
- Network is equivalent to graph.

| points | lines | |
|---|---|---|
| vertices | edges, arcs | math |
| nodes | links | computer science |
| sites | bonds | physics |
| actors | ties, relations | sociology |

# *SOME QUESTIONS...*

To characterize network structure

- Are nodes connected through the network?
- How far apart are they?
- Are some nodes more important due to their position in the network?
- Is the network composed of communities?

# *WHAT TO COMPREHEND..*

- information diffusion
- opinion formation
- coordination/cooperation
- resilience to attack
- ….more

# *TOOL*

- Gephi (visualization and basic network metrics)

Download from:

- http://gephi.org/
- download the datafile dining.gephi from Coursera

# *RESEARCH ACTIVITY*

- Title | Year | Source | Problem Statement | Dataset | Network Type |
- Nodes | Edges | Algorithms | Tools | Key Metrics | Findings | Limitations | Future Work