



LEVERAGING ADVANCES IN SOCIAL NETWORK THINKING FOR NATIONAL SECURITY

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Network Thinking

- Relations matter
- ... but, science has moved beyond description and seeing the world as nodes and lines
 - Not all nodes are the same kind of creature
 - Different types of relations – e.g. membership and interaction
 - The state of the node matters
 - The context of the network matters
- What data is available and who has access to it is changing
- Manipulation, prediction are possible

Networks +



Complexity Challenges

Core Issues

- How is our understanding of networks changing?
- What new methods/theories are emerging or need to emerge?
- Will network science be relevant in 10 years given both advances in other technologies and changing access to data?
- Since access to data for entire network is not possible; how are the biases in data collection and data sources impacting the kinds of conclusions that can be or should be drawn?
- Where are the potential big wins with modest investment?

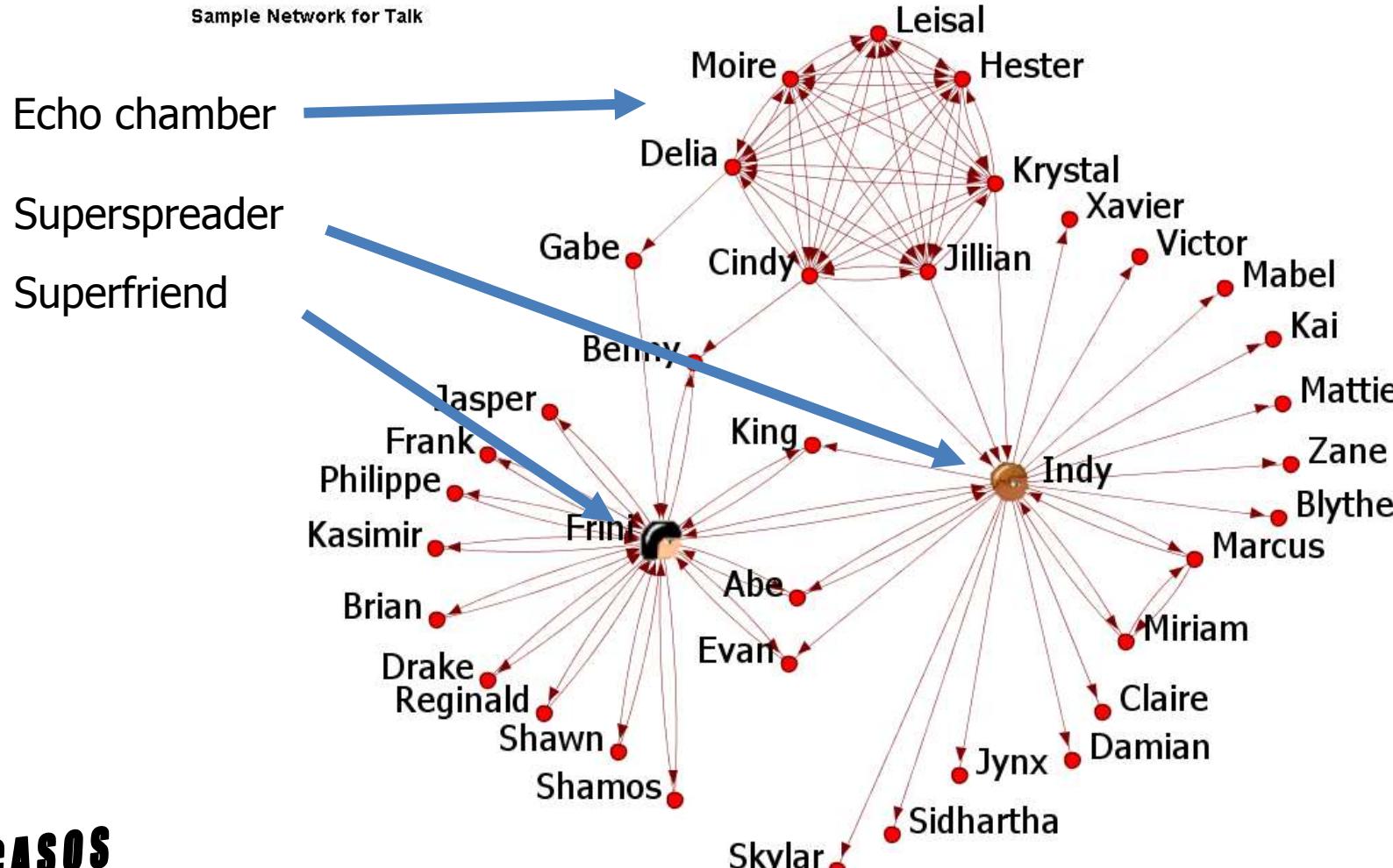
Advances Impacting Network Thinking

What if you cannot determine whether you are interacting with a human or a machine?

- Computational propaganda
 - Machine-driven(cyborg and bot) communications designed to manipulate public opinion and communities
- Video modification plus voice conversion technologies is creating an enhanced disinformation environment with a pliable reality
- Speech analysis technology plus spatial analytics is creating ability to identify actors at distance
- Big data analytics plus psychometric profiling plus machine learning is creating personalized messaging
 - Propaganda, marketing, etc. based on your personality, gender, political preferences, sexual orientation, income, and religion



Information Diffusion Through Networks



Data Considerations and Network Understanding

How is the changing data landscape impacting network thinking?

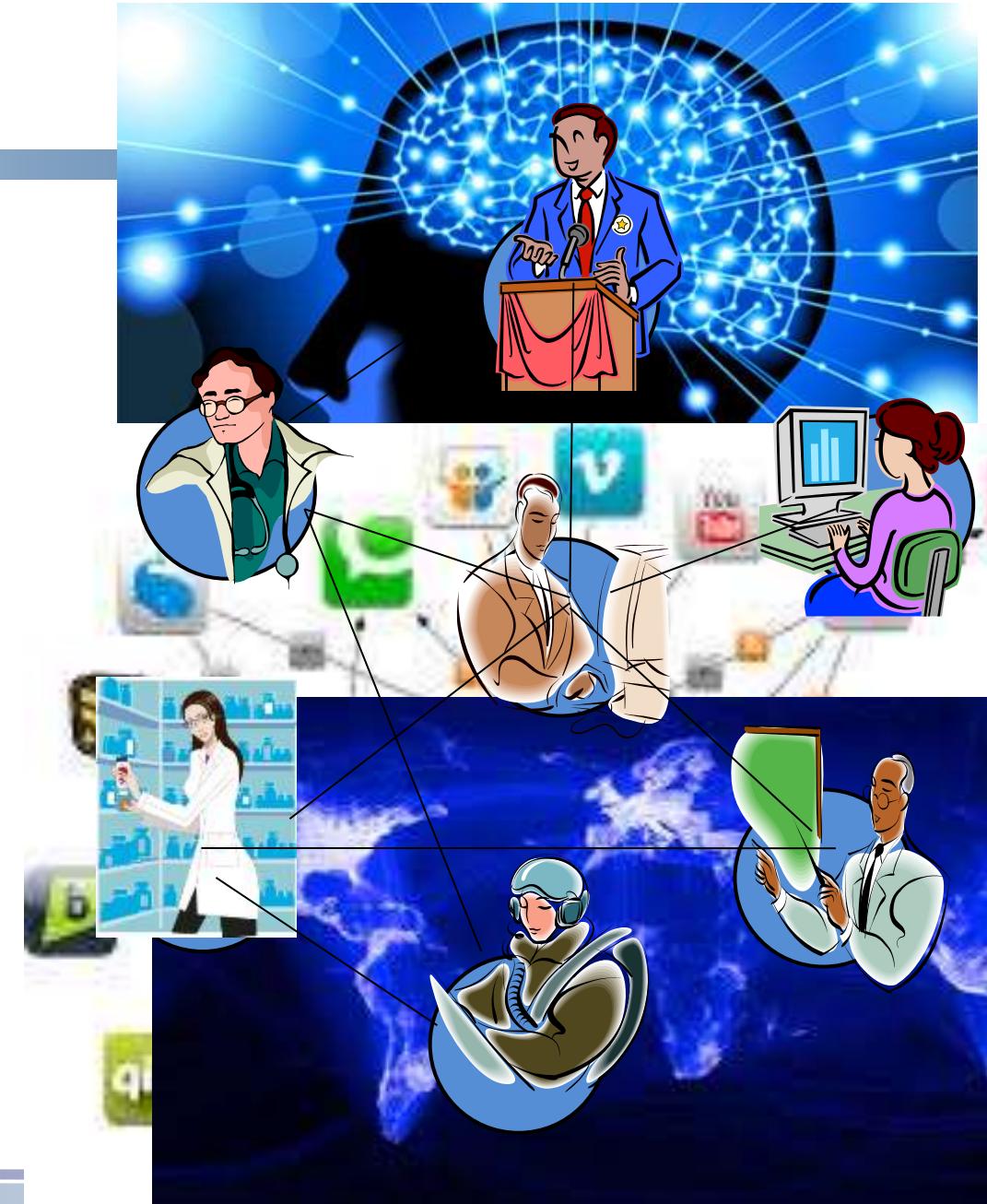
- Remote sensors, neural data collection etc. are creating new data stream for doing network science
- Data providers, e.g., Twitter, control access to data, sampling bias, etc. and so who can address what questions and whether results are replicable
- Authorities to collect and store, impact what data can be used when and so what tools are usable
- Scale and temporal nature of data make many traditional social network metrics less valuable

Illustrations of what this workshop is not about

- Extracting networks from texts
- Automated network data collection
- Scalability of standard metrics
- Generating synthetic networks
- Network visual analytics
- Facebook
- Individual power in informal networks
- Privacy research and node identification

Networks +

- Interactions among actors
- Inside
 - Roles, identities and emotion
 - Neurological issues
- External
 - Media used to communicate
 - Sensors in the built environment
 - Socio-political climatological context



Complexity Challenges

- Networks as ephemeral or evolving or sampled
- Networks as high dimensional
 - E.g. people and topics
- Networks as multi-level
 - each with own spatial, temporal and group logic
- Networks as hidden within networks
- Networks linking across media
- Link between networks and action
- Increasing speed with which data needs to be processed to make intelligence decisions

