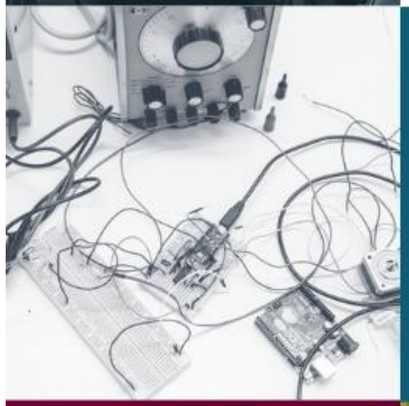
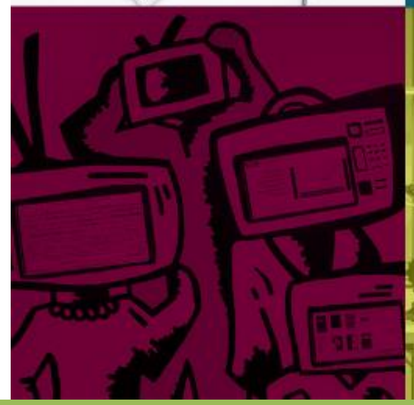
Sherman Centre for Digital Scholarship





Visualizing Networks with Gephi

Subhanya Sivajothy, Data Analysis and Visualization Librarian

October 23rd 2025

A joint initiative of McMaster's Faculty of Humanities and McMaster University Libraries

McMaster University

Land Acknowledgement

McMaster University is located on the traditional Territories of the Mississauga and Haudenosaunee Nations, and within the lands protected by the “Dish With One Spoon” wampum agreement.

Session Recording and Privacy

This session is being recorded with the intention of being shared publicly via the web for future audiences.

In respect of your privacy, participant lists will not be shared outside of this session, nor will question or chat transcripts.

Questions asked via the chat box will be read by the facilitator without identifying you. Note that you may be identifiable when asking a question during the session in an audio or visual format.

Code of Conduct

The Sherman Centre and the McMaster University Library are committed to fostering a supportive and inclusive environment for its presenters and participants.

As a participant in this session, you agree to support and help cultivate an experience that is collaborative, respectful, and inclusive, as well as free of harassment, discrimination, and oppression. We reserve the right to remove participants who exhibit harassing, malicious, or persistently disruptive behaviour.

Please refer to our code of conduct webpage for more information:

scds.ca/events/code-of-conduct/

Book an Appointment with the DASH Team

Receive help from a member of the DASH team! DASH can assist with the following topics:

- Creating data visualizations, including charts, graphs, and scatter plots
- Figuring out which statistical tests to run (e.g., t-test, chi-square, etc.).
- Analyzing data with software including SPSS, Python, R, SAS, ArcGIS, MATLAB, and Excel
- Choosing which software package to use, including free and open-source software
- Troubleshooting problems related to file formats, data retrieval, and download
- Selecting methodology and type of data analysis to use in a thesis project

Book an appointment: **https://library.mcmaster.ca/services/dash**

Certificate Programs

The Sherman Centre for Digital Scholarship Certificate of Attendance

The Sherman Centre's certificate program recognizes attendance at our workshops. It complements degree training, supports the development of critical competencies in data analysis, research data management, and digital scholarship, and formalizes core skills fostered by our workshops.

Participants are invited to attend seven workshops and receive a certificate of attendance. To verify your participation in today's workshop, we will provide a code and additional instructions at the end of the session.

You can learn more about the certificate program at **scds.ca/certificate-program**

The Canadian Certificate for Digital Humanities

This workshop is also eligible for the Canadian Certificate for Digital Humanities. To learn more about the certificate, visit **ccdhhn.ca**. You can also contact local liaison Alexis-Carlota Cochrane at scds@mcmaster.ca

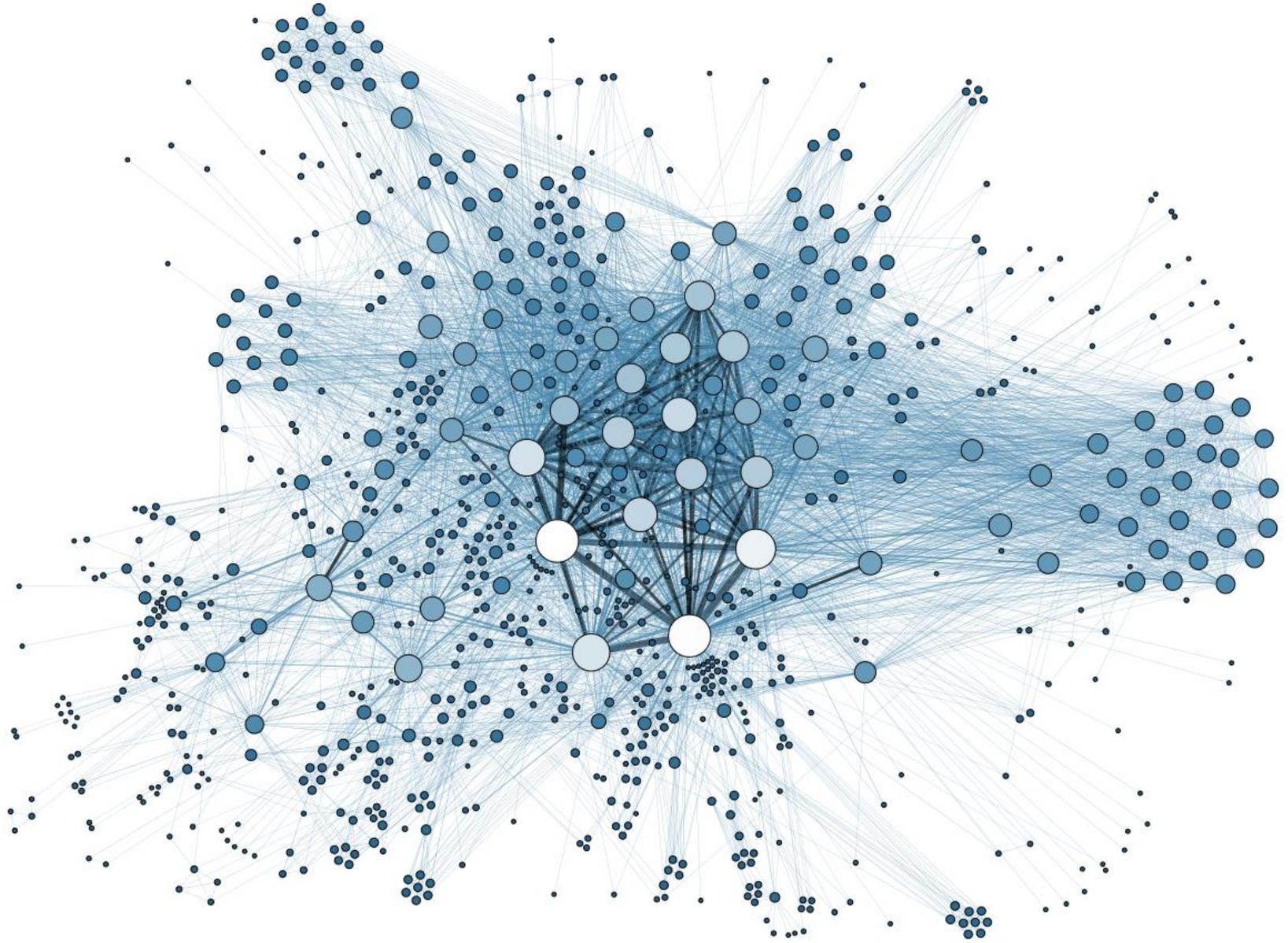
By the end of this workshop…

You'll be able to:

- Define key concepts in network analysis
- Explain what phenomena can be observed through network analysis
- Create a network visualization in Gephi

Have you downloaded Gephi?

- Go right to the source: https://gephi.org



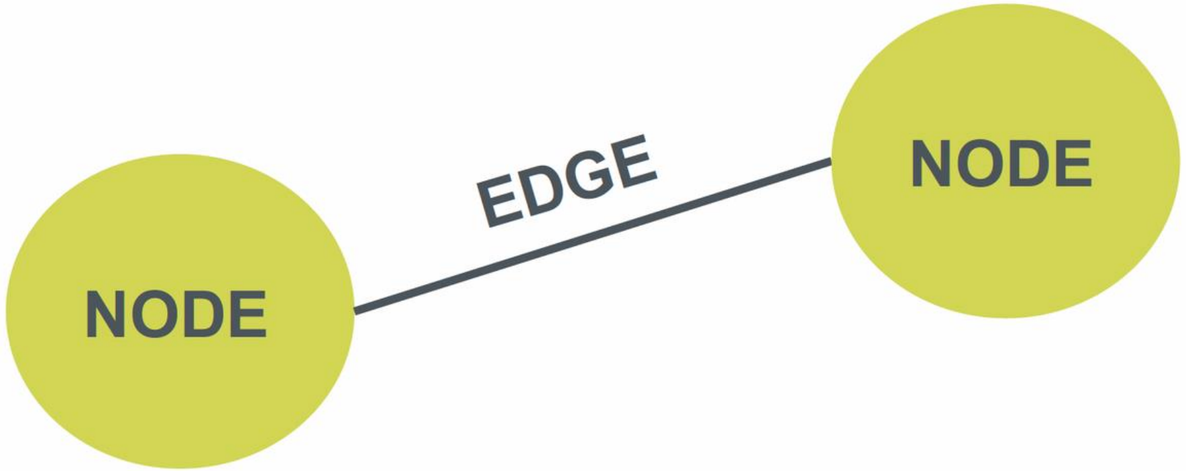
source: http://www.martingrandjean.ch/introduction-to-network-visualization-gephi/

Describing Relationships

Node: the ‘actor’ in the network

Edge: the relationship connecting actors

Attribute: features of the node or edge



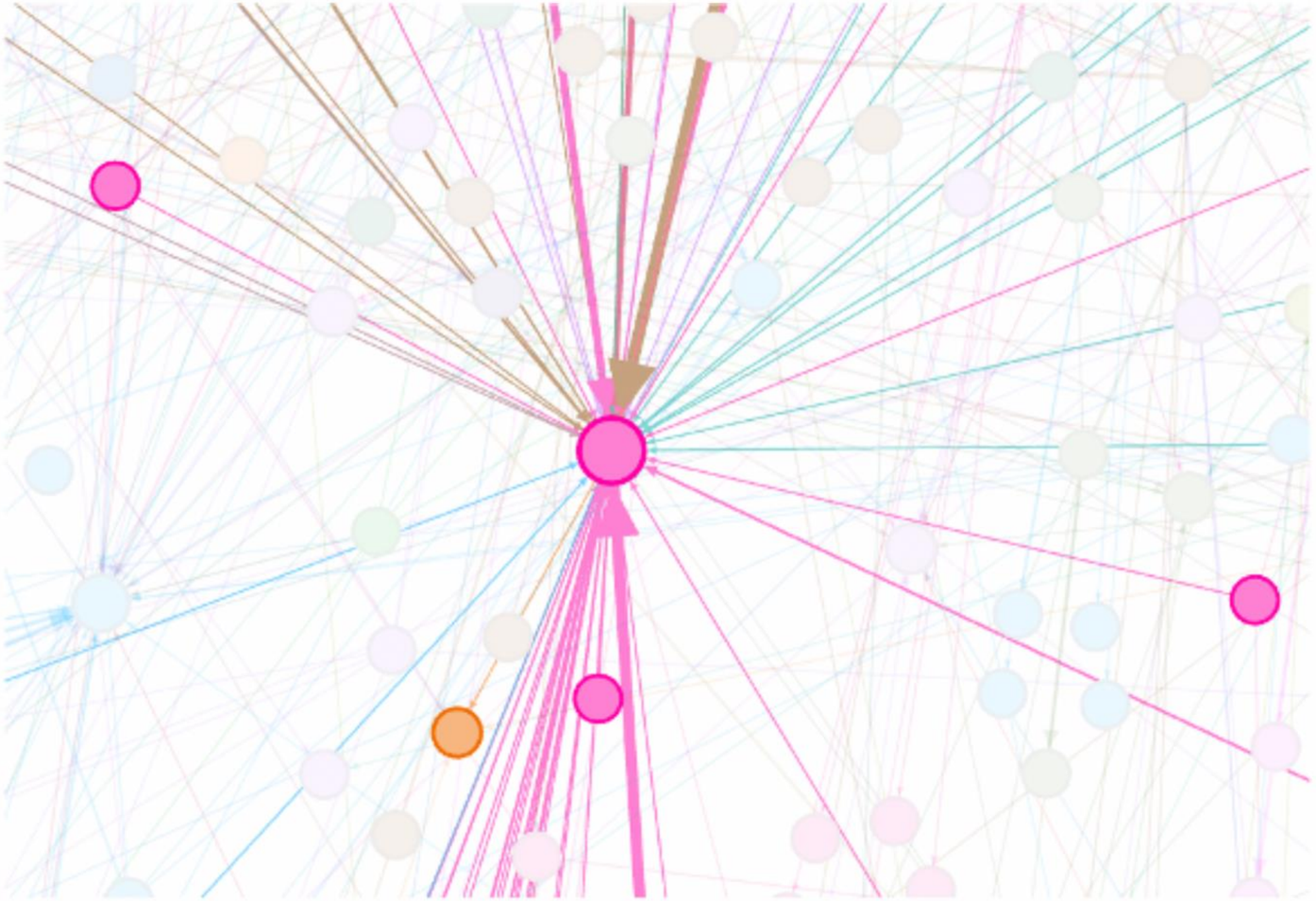
Other terminology

Edges can be **directed** or **undirected**.

Directed edges allow us to calculate **in-degree** and **out-degree**.

- In-degree: number of incoming directed edges
- Out-degree: number of outgoing directed edges

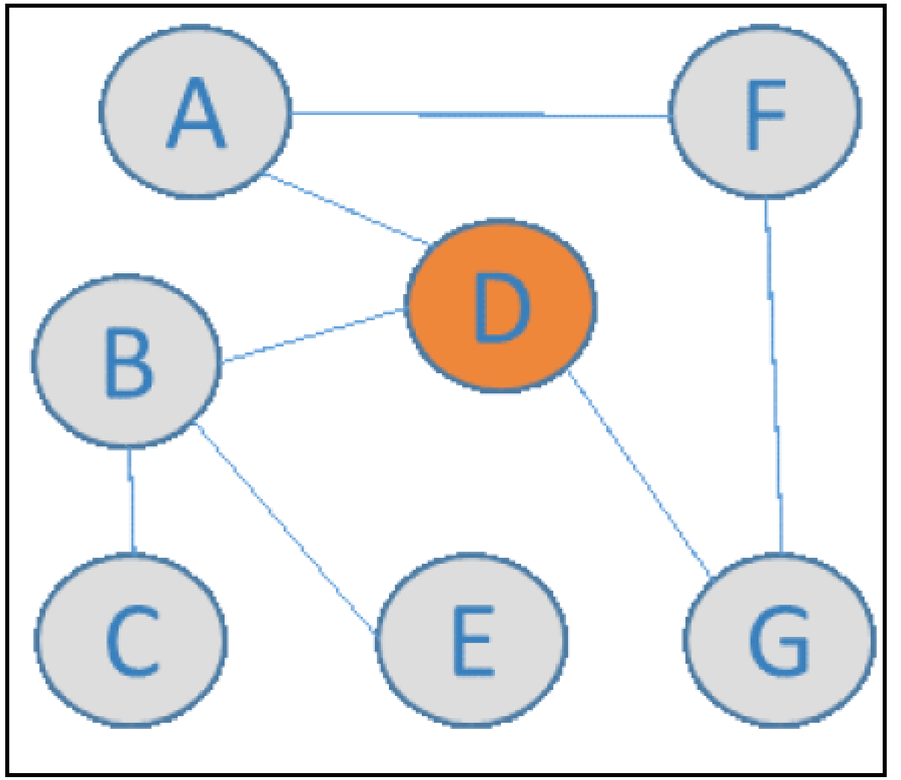
Directed edges can also have a relative **weight**.



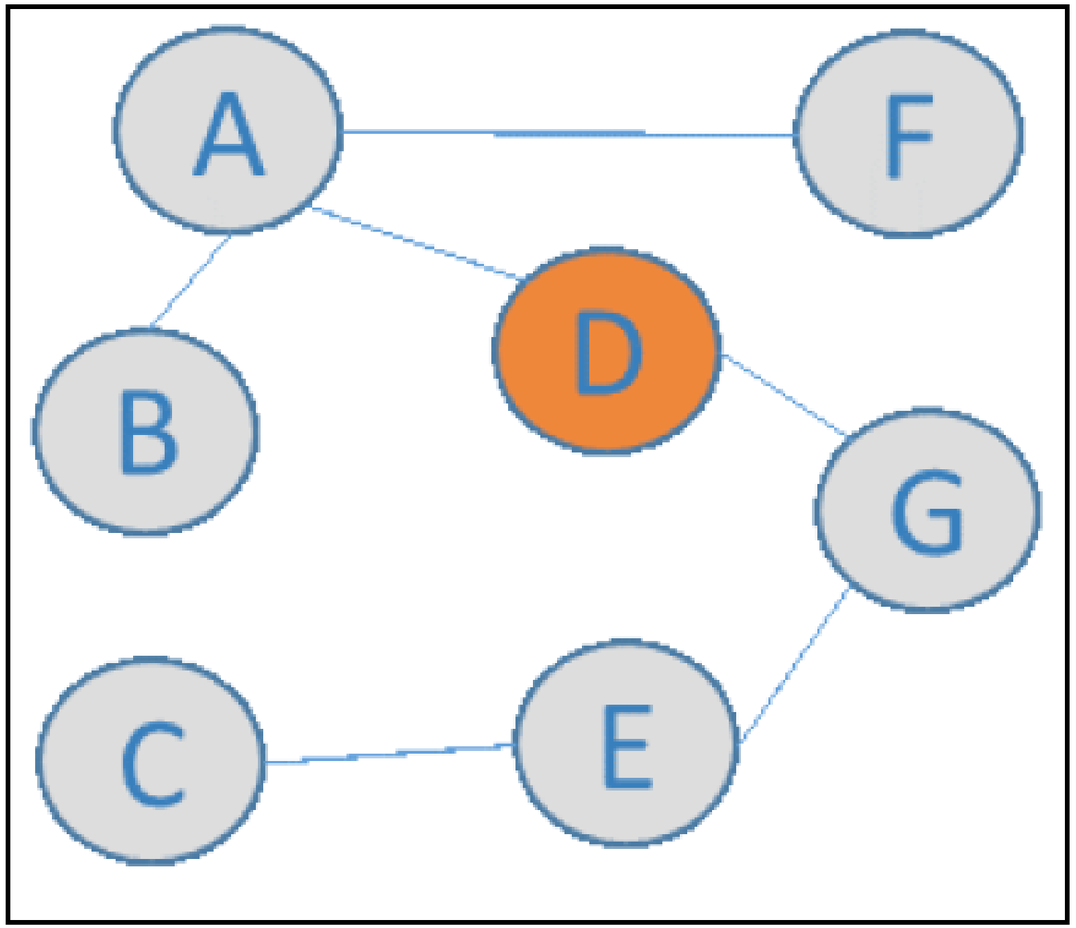
Network graph with weighted edges

Determining which nodes are the most important in the cluster or graph…

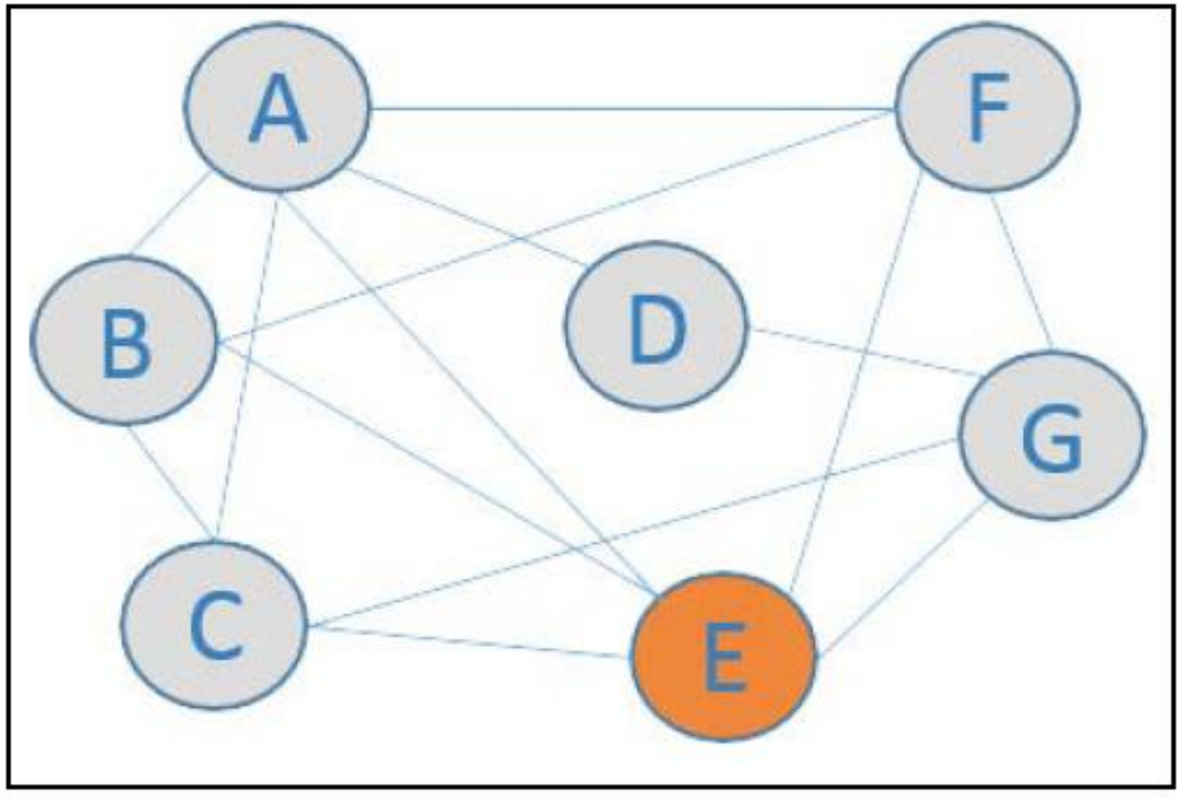
- **Degree**
  - nodes with the most connections (i.e. edges)
- **Closeness**
  - nodes closest to all other nodes (as a path)
- **Betweenness**
  - nodes which bridge the shortest paths
- **Eigenvector**
  - nodes that have a higher relative influence



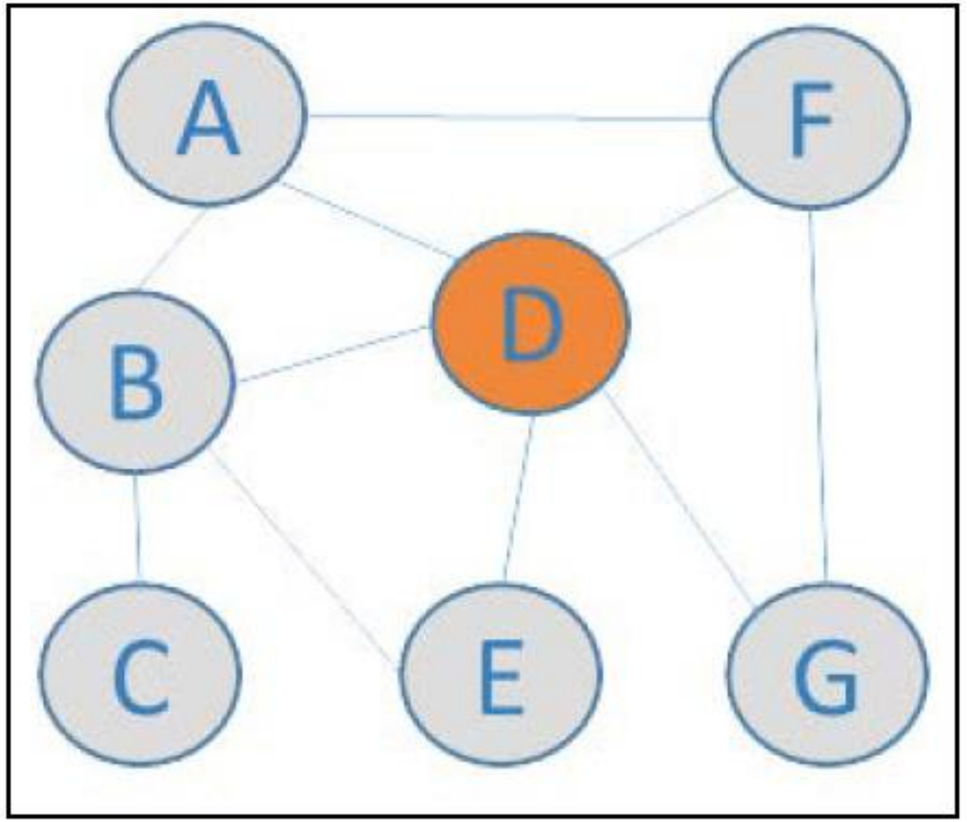
Closeness centrality



Betweenness centrality

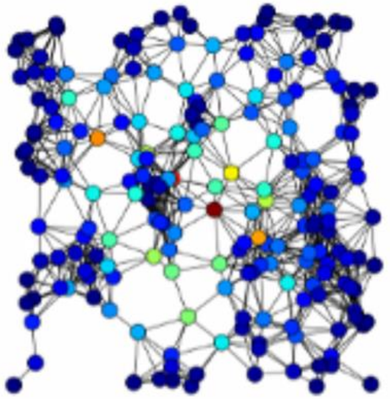


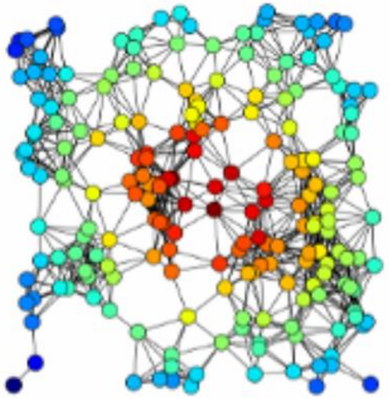
Eigenvector centrality



Degree centrality

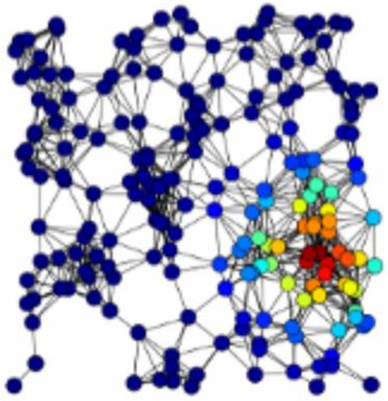
A. Betweenness

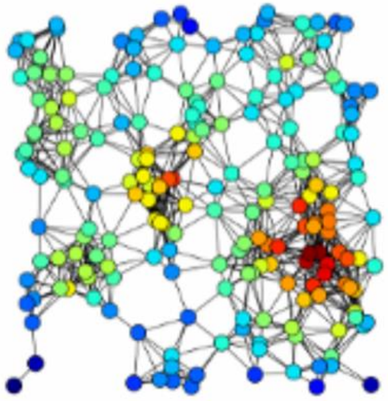




B. Closeness

C. Eigenvector



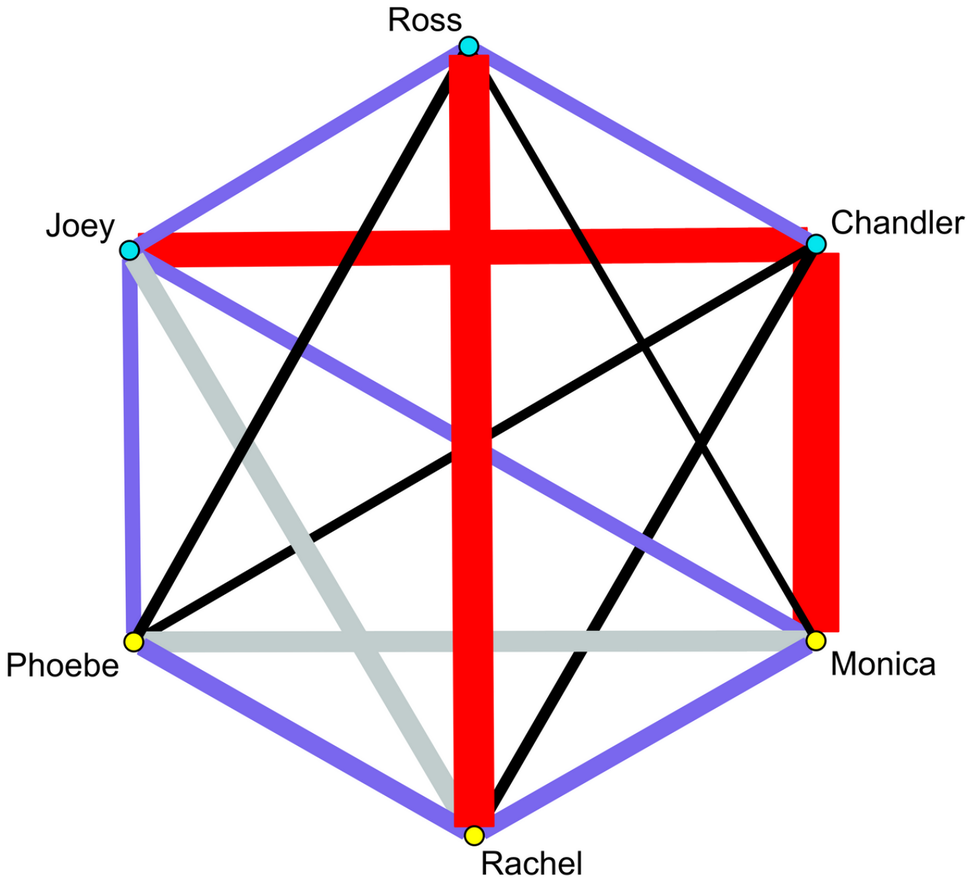


D. Degree

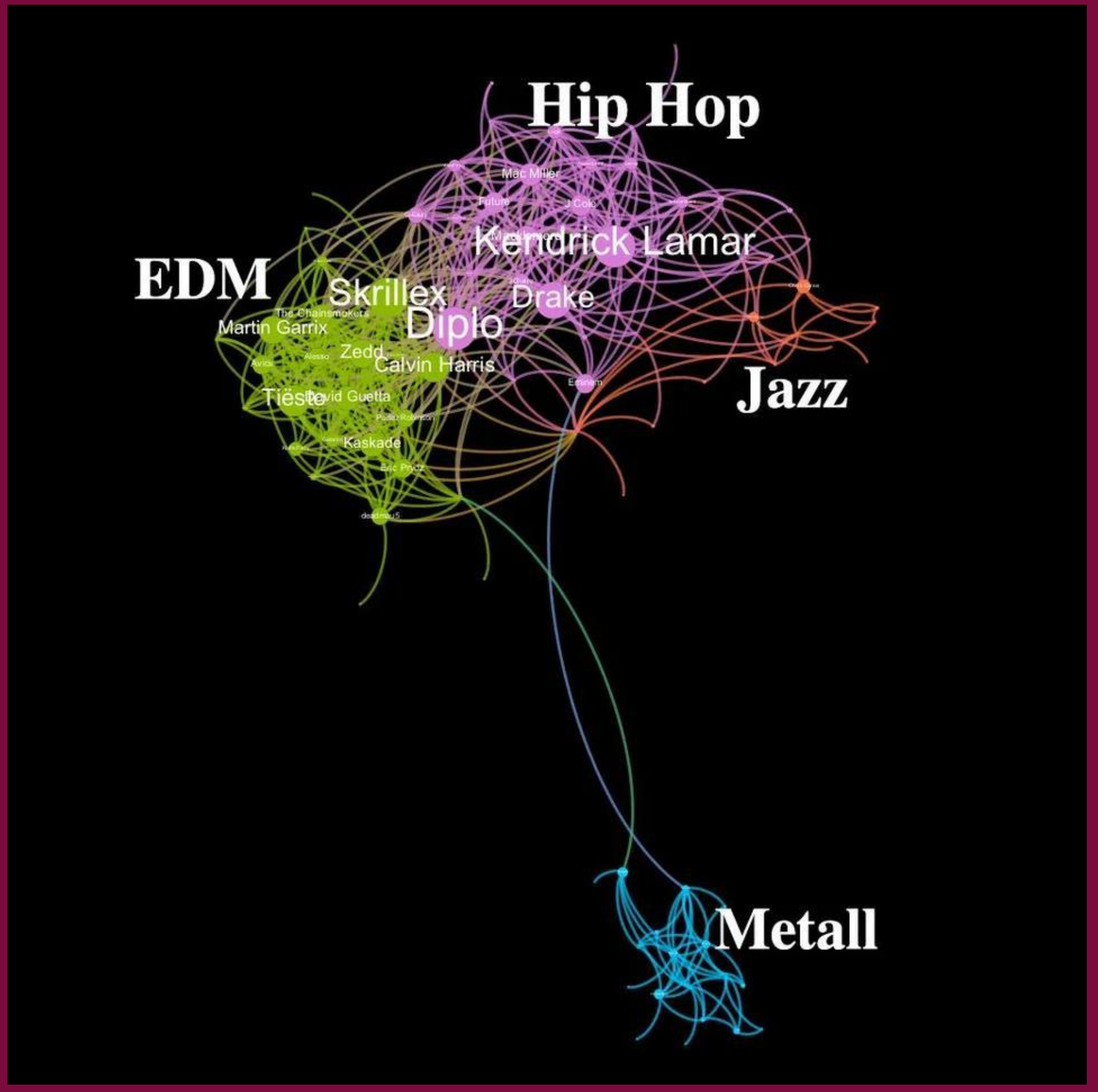
Image: Tapiocozzo (CC 4.0 BY-SA)

'Friends' Network

Edges Weighted by Number of Shared Plotlines



Edge Coloring: Black [0,20]; Purple (20,35]; Gray (35,50]; Red (50,94]
Vertex Coloring: Yellow for Female Characters; Blue for Male Characters


Hip Hop
Mac Miller
Future
Kendrick Lamar
EDM
Skrillex
Drake
Diplo
The Chainsmokers
Martin Garrix
Zedd
Calvin Harris
Tiësto
David Guetta
Kaskade
Jazz
Metall

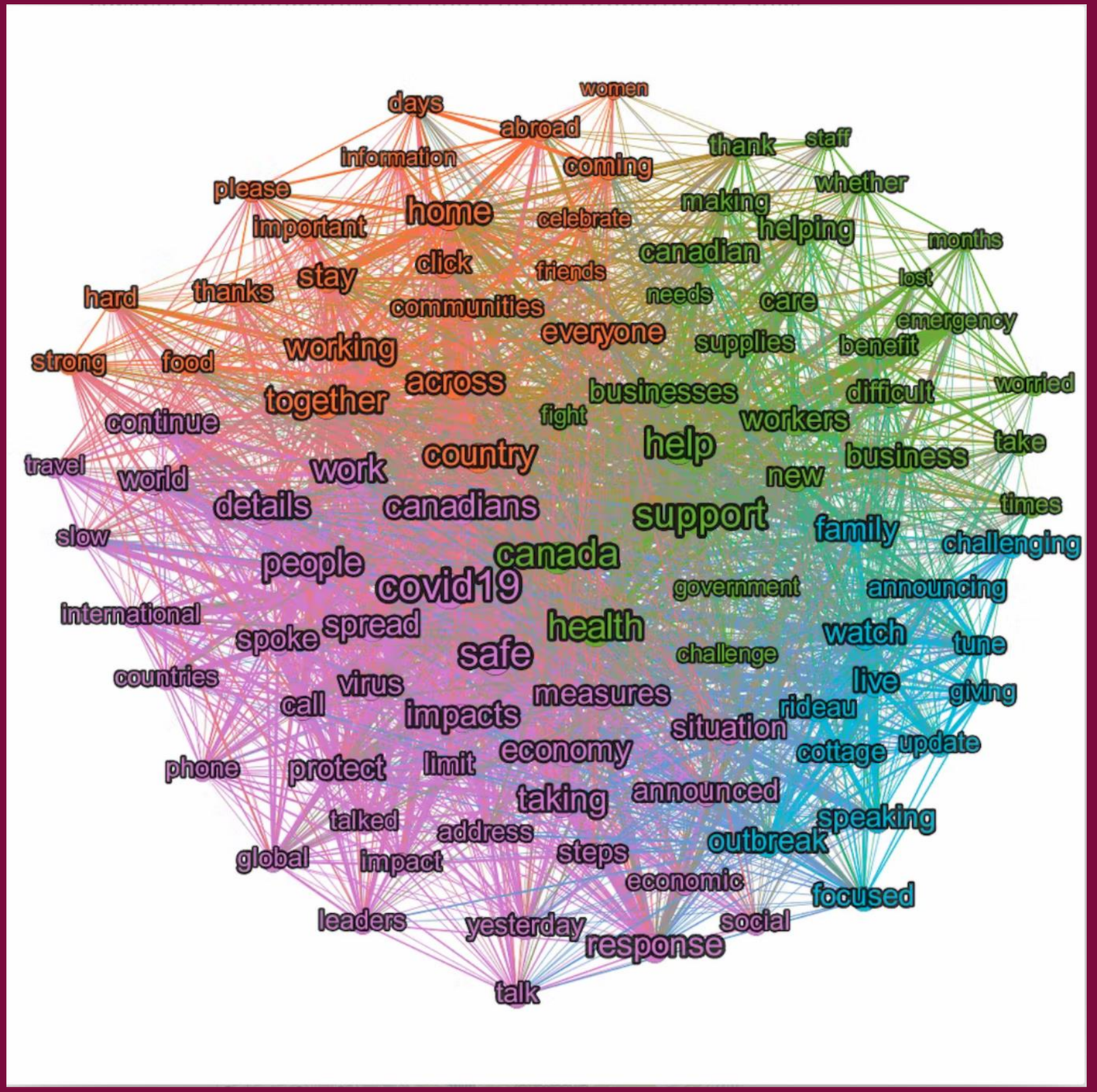

women
days
abroad
thank
staff
information
coming
please
whether
making
home
celebrate
helping
important
months
canadian
click
stay
friends
lost
hard
thanks
needs
care
communities
emergency
everyone
supplies
benefit
working
strong
food
across
businesses
difficult
worried
together
fight
workers
continue
help
take
country
business
travel
work
new
world
details
canadians
support
times
slow
family
challenging
canada
people
covid19
government
announcing
international
spread
health
watch
tune
spoke
safe
challenge
countries
virus
live
giving
measures
call
rideau
impacts
situation
economy
cottage
update
phone
protect
limit
taking
announced
talked
speaking
address
outbreak
global
impact
steps
economic
focused
leaders
yesterday
social
response
talk

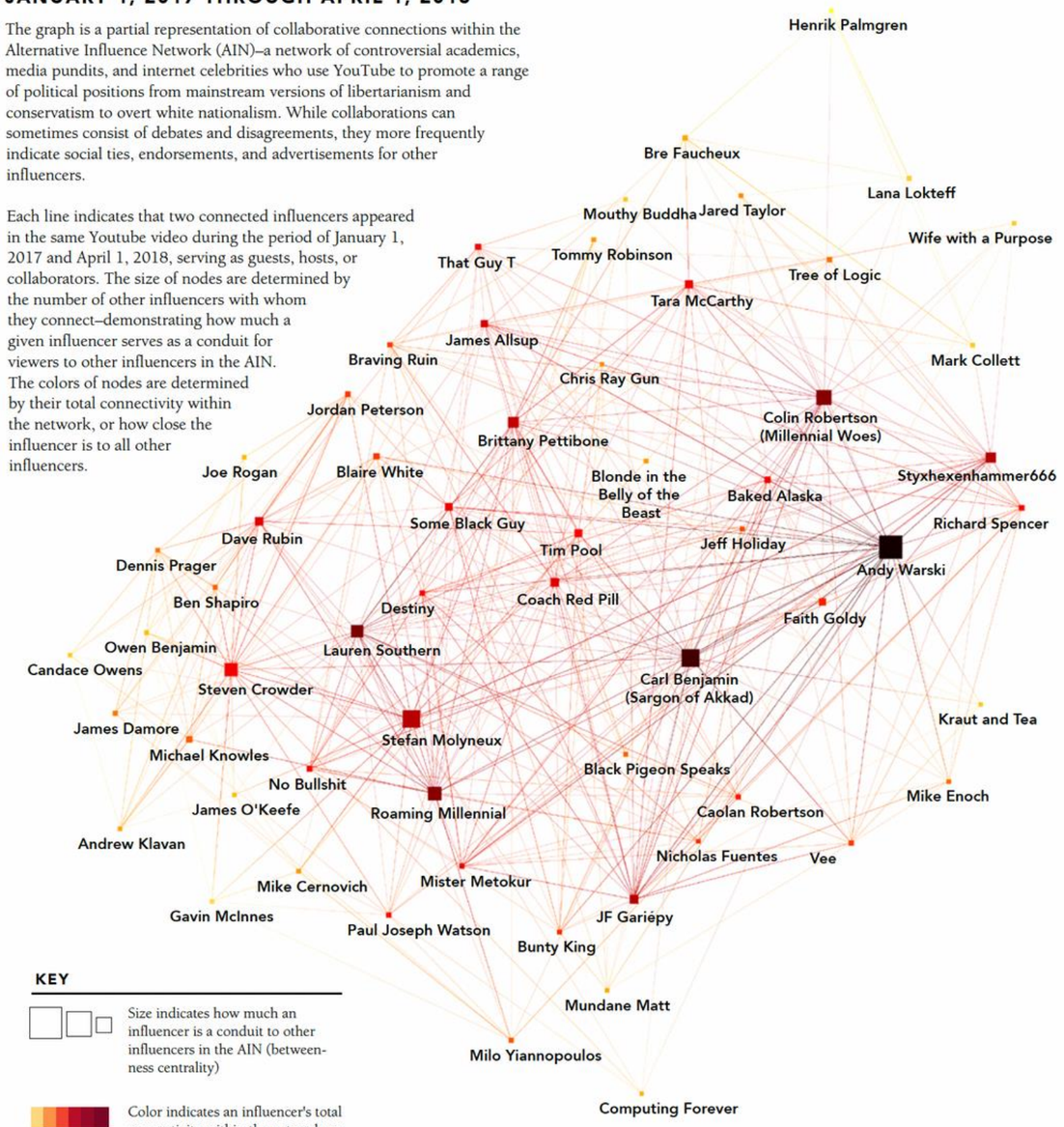
Fig. 1

THE ALTERNATIVE INFLUENCE NETWORK ON YOUTUBE

GUEST APPEARANCES ON THE NETWORK FROM JANUARY 1, 2017 THROUGH APRIL 1, 2018

The graph is a partial representation of collaborative connections within the Alternative Influence Network (AIN)–a network of controversial academics, media pundits, and internet celebrities who use YouTube to promote a range of political positions from mainstream versions of libertarianism and conservatism to overt white nationalism. While collaborations can sometimes consist of debates and disagreements, they more frequently indicate social ties, endorsements, and advertisements for other influencers.

Each line indicates that two connected influencers appeared in the same Youtube video during the period of January 1, 2017 and April 1, 2018, serving as guests, hosts, or collaborators. The size of nodes are determined by the number of other influencers with whom they connect–demonstrating how much a given influencer serves as a conduit for viewers to other influencers in the AIN. The colors of nodes are determined by their total connectivity within the network, or how close the influencer is to all other influencers.



KEY

Size indicates how much an influencer is a conduit to other influencers in the AIN (betweenness centrality)

Color indicates an influencer's total connectivity within the network, or how close the influencer is to all other influencers (closeness centrality)

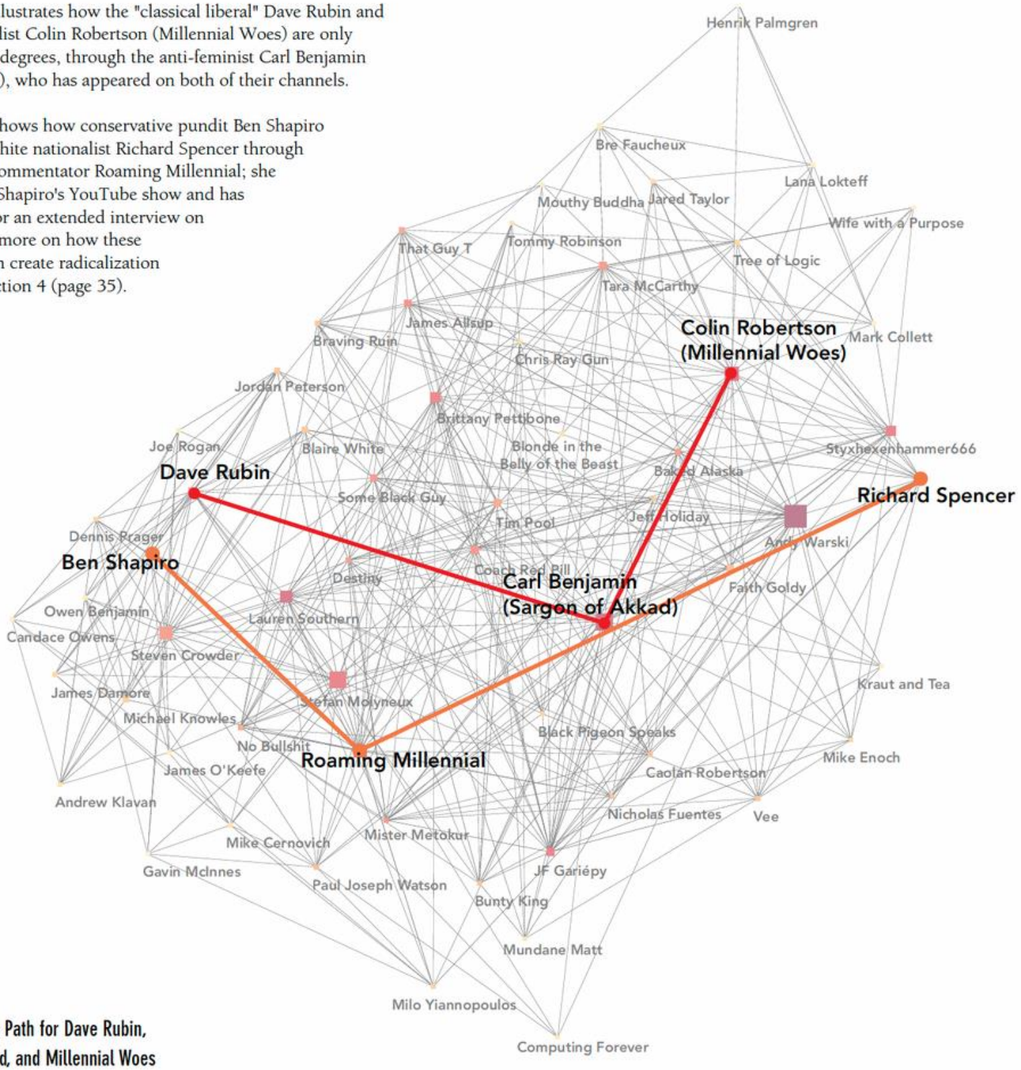
Fig. 1 (detail)

AIN NETWORK PATHS

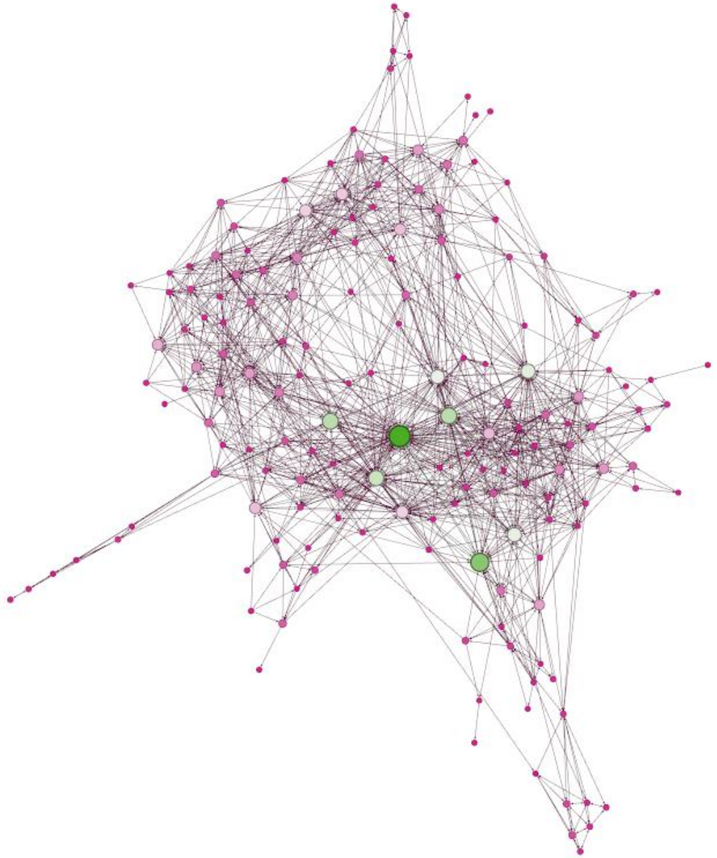
These graphs show examples of collaborative connections between influencers of differing ideologies and how these collaborations can create pathways to radicalization.

Network Path 1 illustrates how the "classical liberal" Dave Rubin and the white nationalist Colin Robertson (Millennial Woes) are only separated by two degrees, through the anti-feminist Carl Benjamin (Sargon of Akkad), who has appeared on both of their channels.

Network Path 2 shows how conservative pundit Ben Shapiro is connected to white nationalist Richard Spencer through the vlogger and commentator Roaming Millennial; she has appeared on Shapiro's YouTube show and has hosted Spencer for an extended interview on her channel. For more on how these collaborations can create radicalization pathways, see Section 4 (page 35).



Focus: Network Path for Dave Rubin, Sargon of Akkad, and Millennial Woes

To read more about Network Path 1, see page 12.

Gephi