



GET1030

Computers and the humanities

## Lecture 8

Tools for network analysis

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# Objectives

Calculate network measurements in Gephi and export network visualizations

Create networks in Gephi from scratch

Create networks in Python and visualize their properties



# Installing Gephi

You can download the program from <https://gephi.org/>

**NOTE:** The current stable version of Gephi will only run with Java 7 or 8. On Mac OS X, Java is bundled with the application so it doesn't have to be installed separately. On Windows and Linux, the system must be equipped with Java.

I recommend installing the JRE 8 at <https://www.oracle.com/java/technologies/javase-jre8-downloads.html>

Please install and run it before the session and ask me if you have questions.

# **Lecture 8**

## Tools for network analysis

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Part 1: Network measurements and visualizations in Gephi



# Les Misérables

A classical French novel by Victor Hugo published in 1862.

It was been adapted numerous times in film and theatre.



Portrait of "Cosette" by Emile Bayard, from the original edition of *Les Misérables* (1862)



2012 Film



1980s musical

# **Lecture 8**

## Tools for network analysis

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### Part 2: Creating networks in Gephi



# Co-occurrence networks

## Collaborations

## Fictional characters

List of co-occurrences

A,B

A,C,D

A,B,C



# Co-occurrence networks

## Multiple networks

### Marvel Cinematic Universe Collaborations

Film	U.S. release date	Director(s)	Screenwriter(s)	Producer(s)
Phase One <sup>[10]</sup>				
<i>Iron Man</i>	May 2, 2008	Jon Favreau <sup>[11]</sup>	Mark Fergus & Hawk Ostby and Art Marcum & Matt Holloway <sup>[11][12]</sup>	Avi Arad and Kevin Feige
<i>The Incredible Hulk</i>	June 13, 2008	Louis Leterrier <sup>[13]</sup>	Zak Penn <sup>[14]</sup>	Avi Arad, Gale Anne Hurd and Kevin Feige
<i>Iron Man 2</i>	May 7, 2010	Jon Favreau <sup>[15]</sup>	Justin Theroux <sup>[16]</sup>	Kevin Feige
<i>Thor</i>	May 6, 2011	Kenneth Branagh <sup>[17]</sup>	Ashley Edward Miller & Zack Stentz and Don Payne <sup>[18]</sup>	
<i>Captain America: The First Avenger</i>	July 22, 2011	Joe Johnston <sup>[19]</sup>	Christopher Markus & Stephen McFeely <sup>[20]</sup>	
<i>Marvel's The Avengers</i>	May 4, 2012	Joss Whedon <sup>[21]</sup>		

Jon Favreau, Mark Fergus, Hawk Ostby, Art Marcum, Matt Holloway, Avi Arad, Kevin Feige

Louis Leterrier, Zak Penn, Avi Arad, Gale Anne Hurd, Kevin Feige

Jon Favreau, Justin Theroux, Kevin Feige

Kenneth Branagh, Ashley Edward Miller, Zack Stentz, Don Payne, Kevin Feige

Joe Johnston, Christopher Markus, Stephen McFeely, Kevin Feige

Joss Whedon, Kevin Feige





# Co-occurrence networks

		Phase Two <sup>[10]</sup>		
<i>Iron Man 3</i>	May 3, 2013	Shane Black <sup>[22]</sup>	Drew Pearce and Shane Black <sup>[22][23]</sup>	Kevin Feige
<i>Thor: The Dark World</i>	November 8, 2013	Alan Taylor <sup>[24]</sup>	Christopher L. Yost and Christopher Markus & Stephen McFeely <sup>[25]</sup>	
<i>Captain America: The Winter Soldier</i>	April 4, 2014	Anthony and Joe Russo <sup>[26]</sup>	Christopher Markus & Stephen McFeely <sup>[27]</sup>	
<i>Guardians of the Galaxy</i>	August 1, 2014	James Gunn <sup>[28]</sup>	James Gunn and Nicole Perlman <sup>[29]</sup>	
<i>Avengers: Age of Ultron</i>	May 1, 2015	Joss Whedon <sup>[30]</sup>		
<i>Ant-Man</i>	July 17, 2015	Peyton Reed <sup>[31]</sup>	Edgar Wright & Joe Cornish and Adam McKay & Paul Rudd <sup>[32]</sup>	

Shane Black,Drew Pearce,Shane Black,Kevin Feige  
 Alan Taylor,Christopher L. Yost,Christopher Markus,Stephen McFeely,Kevin Feige  
 Anthony Russo, Joe Russo,Christopher Markus,Stephen McFeely,Kevin Feige  
 James Gunn,James Gunn, Nicole Perlman,Kevin Feige  
 Joss Whedon,Kevin Feige  
 Peyton Reed,Edgar Wright,Joe Cornish,Adam McKay,Paul Rudd,Kevin Feige



# Co-occurrence networks

Phase Three <sup>[10][33]</sup>				
<i>Captain America: Civil War</i>	May 6, 2016	Anthony and Joe Russo <sup>[34]</sup>	Christopher Markus & Stephen McFeely <sup>[34]</sup>	Kevin Feige
<i>Doctor Strange</i>	November 4, 2016	Scott Derrickson <sup>[36]</sup>	Jon Spaihts and Scott Derrickson & C. Robert Cargill <sup>[36]</sup>	
<i>Guardians of the Galaxy Vol. 2</i>	May 5, 2017	James Gunn <sup>[29]</sup>		
<i>Spider-Man: Homecoming</i>	July 7, 2017	Jon Watts <sup>[37]</sup>	Jonathan Goldstein & John Francis Daley and Jon Watts & Christopher Ford and Chris McKenna & Erik Sommers <sup>[36]</sup>	Kevin Feige and Amy Pascal
<i>Thor: Ragnarok</i>	November 3, 2017	Taika Waititi <sup>[39]</sup>	Eric Pearson and Craig Kyle & Christopher L. Yost <sup>[40][41]</sup>	Kevin Feige
<i>Black Panther</i>	February 16, 2018	Ryan Coogler <sup>[42]</sup>	Ryan Coogler & Joe Robert Cole <sup>[43][44]</sup>	
<i>Avengers: Infinity War</i>	April 27, 2018	Anthony and Joe Russo <sup>[45]</sup>	Christopher Markus & Stephen McFeely <sup>[46]</sup>	
<i>Ant-Man and the Wasp</i>	July 6, 2018	Peyton Reed <sup>[47]</sup>	Chris McKenna & Erik Sommers and Paul Rudd & Andrew Barrer & Gabriel Ferrari <sup>[48]</sup>	Kevin Feige and Stephen Broussard
<i>Captain Marvel</i>	March 8, 2019	Anna Boden and Ryan Fleck <sup>[49]</sup>	Anna Boden & Ryan Fleck & Geneva Robertson-Dworek <sup>[50]</sup>	Kevin Feige
<i>Avengers: Endgame</i>	April 26, 2019	Anthony and Joe Russo <sup>[45]</sup>	Christopher Markus & Stephen McFeely <sup>[46]</sup>	
<i>Spider-Man: Far From Home</i>	July 2, 2019	Jon Watts <sup>[51]</sup>	Chris McKenna & Erik Sommers <sup>[52]</sup>	Kevin Feige and Amy Pascal

Anthony Russo, Joe Russo, Christopher Markus, Stephen McFeely, Kevin Feige  
 Scott Derrickson, Jon Spaihts, Scott Derrickson, C. Robert Cargill, Kevin Feige  
 James Gunn, Kevin Feige  
 Jon Watts, Jonathan Goldstein, John Francis Daley, Christopher Ford, Chris McKenna, Erik Sommers, Kevin Feige, Amy Pascal  
 Taika Waititi, Eric Pearson, Craig Kyle, Christopher L. Yost, Kevin Feige  
 Ryan Coogler, Ryan Coogler, Joe Robert Cole, Kevin Feige  
 Peyton Reed, Chris McKenna, Erik Sommers, Paul Rudd, Andrew Barrer, Gabriel Ferrari, Kevin Feige, Stephen Broussard  
 Anna Boden, Ryan Fleck, Anna Boden, Ryan Fleck, Geneva Robertson-Dworet, Kevin Feige  
 Anthony Russo, Joe Russo, Christopher Markus, Stephen McFeely, Kevin Feige  
 Jon Watts, Chris McKenna, Erik Sommers, Kevin Feige, Amy Pascal

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Part 3: Export the data to Python



# Jupyter notebook

Visualizing data in Jupyter

(with a couple of new Pandas and Seaborn functions)

See the `Example_completed` notebook in this week's files.