NOW IT'S TIME FOR:

NETWORK ANALYSIS

WHY NETWORKS? WE ALREADY TAKE SO MANY $# %^*NG METHODS CLASSES.

I KNOW.

BUT

MOST OF THE STATS YOU LEARN OPERATE ON THE ASSUMPTION OF INDEPENDENCE

SOCIAL SCIENCE =RELIANCE ON METHODOLOGICAL INDIVIDUALISM

ANYTIME CONNECTIONS ARE FOSTERED

- Between people
- Among groups
- Through tools (like texts, practices, strategies)

Networks Result

PEOPLE ARE EMBEDDED IN NETWORKS

- either through their social connections
- as part of their membership/role in an organization
- or through their material/embodied/day-to-day interactions

- But our current approach to investigating learning and change divorces people from their networks

NETWORK DATA MAKES YOUR STUDY BETTER

BY:

- adding context to your qualitative description of environments and community
- providing the opportunity to connect individual explanatory variables to meso-level factors
- identifying the relationship between the structure of a social context and the agency of an individual to make decisions within that context

HERE IS A REALLY GOOD EXAMPLE

PEER COLLABORATION IS NECESSARY FOR SUCCESS IN PHYSICS

- Group composition is significantly related to women's performance in STEM courses (e.g. Dasgupta, Scircle, & Hunsinger, 2015; McCullough, 2002; Stout, Dasgupta, Hunsinger, McManus, 2011)
- Physics curriculum = disciplinary "logic of collaboration" (Nespor, 1994, p. 40).
- Students with lower levels of overlap between their social and academic world have a harder time persisting in Physics (Nespor, 1994; Forsman, Linder, Moll, Fraser, & Andersen, 2014; Forsman, Moll, and Linder, 2014)

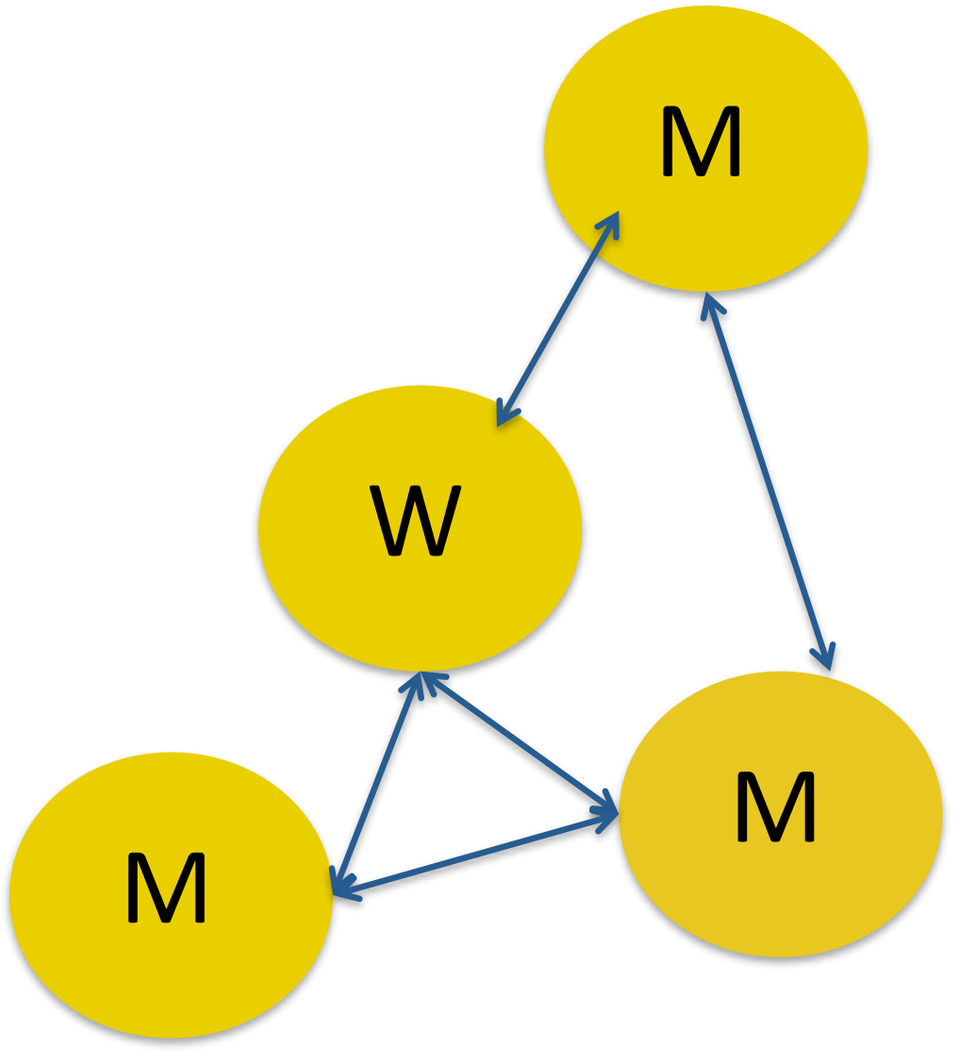
POTENTIAL PROBLEM WITH PEER SELECTION

- Women and Students of Color are substantially underrepresented in undergraduate Physics
- Prior research suggests that students are most likely to choose peers who resemble them
- This potentially leaves Women and SOC at a disadvantage for engaging in collaboration

Men in Physics (top) and Women in Physics (bottom) Google Image Search

THE PUSH AND PULL OF PEER INSTRUCTION

- *Pull*: Everyone participated in some collaborative partnerships during interactive instruction, even if they reported they were a loner
- *Push:* During observations three types of groups formed:
  - Men only (3 groups)
  - Women only (1 group)
  - Mixed groups with one woman and three-five men (9 groups)
- One student remarked that gravity was "pushing the genders apart" as part of a debrief activity on gravitational forces



Example Project Cluster from the network

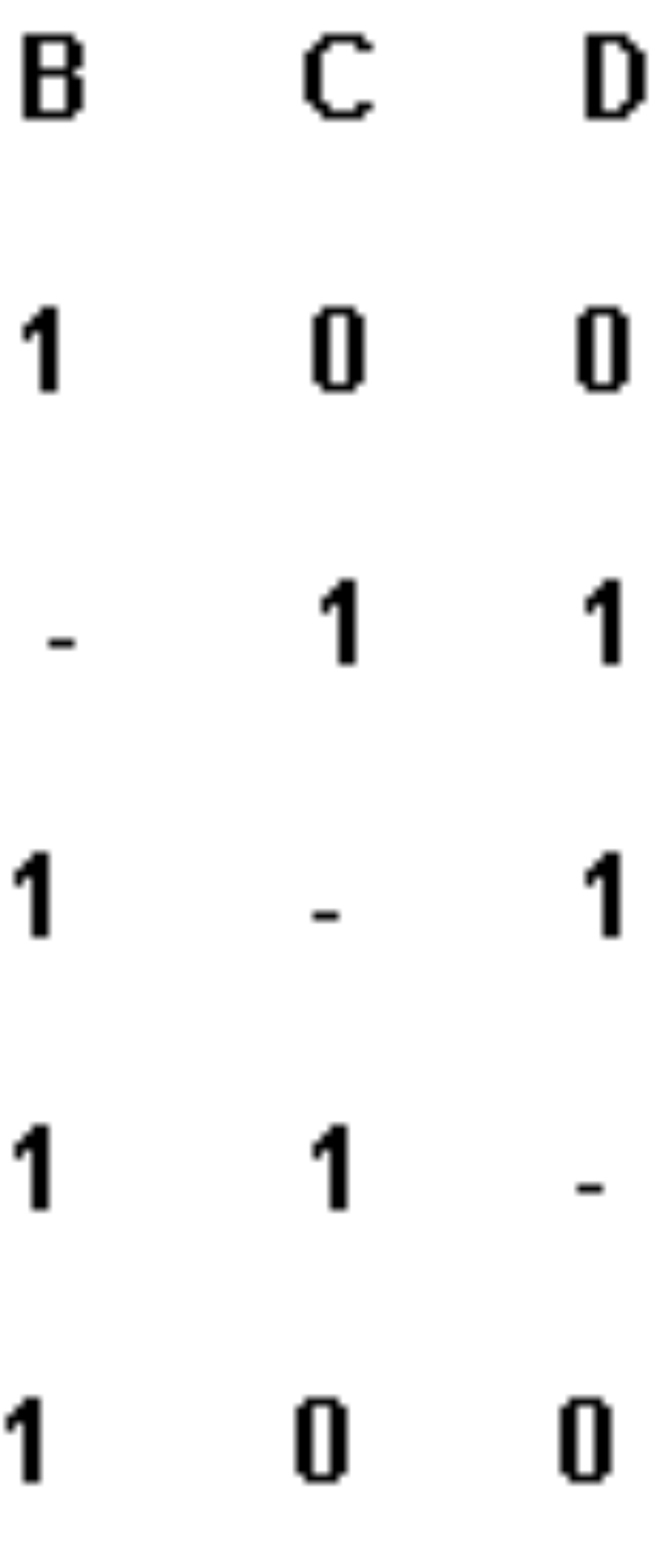
BY MAPPING THE SOCIAL NETWORK

- I observed gendered sorting
- Was able to identify instructional practices that fostered & deterred diverse sorting
- Could investigate the relationship between diverse sorting behaviors and academic success (although I haven't….I should of….That's a really good idea…like a logistic regression where there's a covariate for diverse or homogenous collaborative group….).

I’m sold. But how do I do it?

I’m so glad you asked.

From the Home Shopping NETWORK!!!



MATRICES ARE THE BASIS OF ALL NETWORK ANALYSIS

ADJACENCY MATRIX

	Posselt, Jr	Jaquette, O	Kim, J	Kleinman, M	Samuels, E	Bowman, Na	Harris, Nf	Gumport, Pj	Lattuca, Lr	Carter, Df	Ro, Hk	Alcott, B	Magolda, Mb	Perez, Rj	Shim, W	King, Pm	Hyman, Jm	Dynarski, Sm	Hemelt, Sw	Terenzini, Pt	Me
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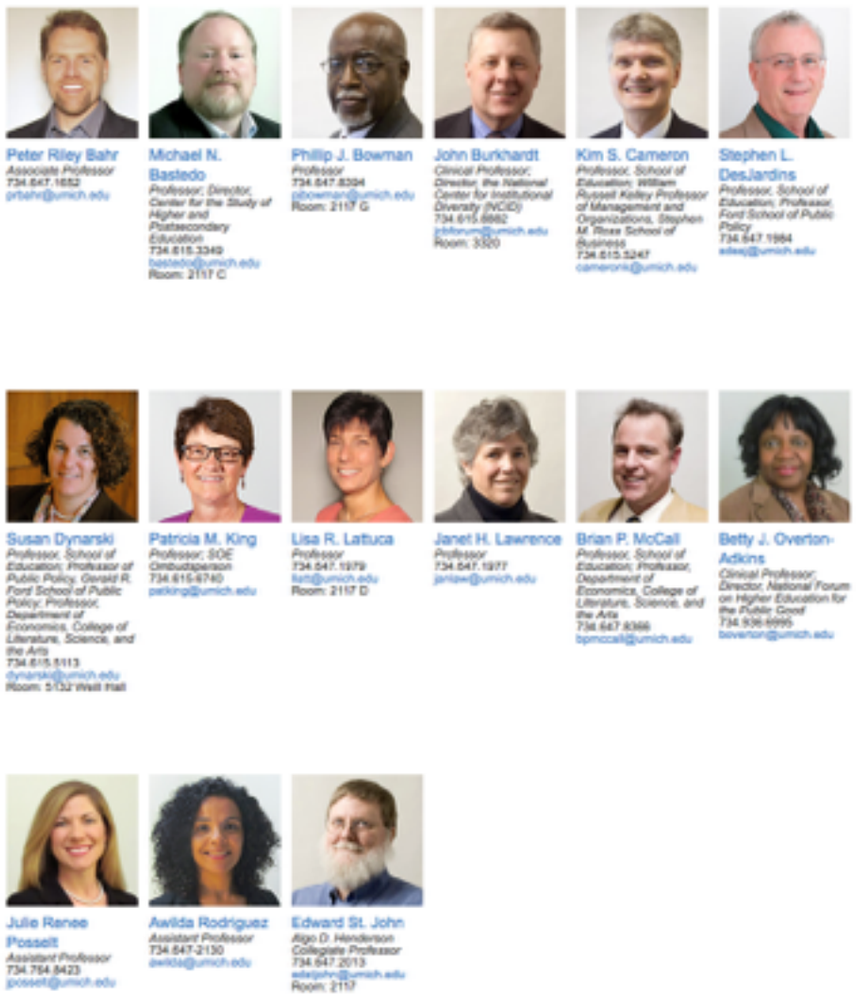


I did this in like 20 minutes so I didn't include research faculty or Awilda or Jan because their last names are too common for a quick search. Also, at some point Sue started using a middle initial so she's in here twice. LISTEN- it's an example. It's not research

HOW CONNECTED ARE OUR FACULTY?

BASIC NETWORK DESCRIPTIVES

Authors in the dataset

Tie is not sent

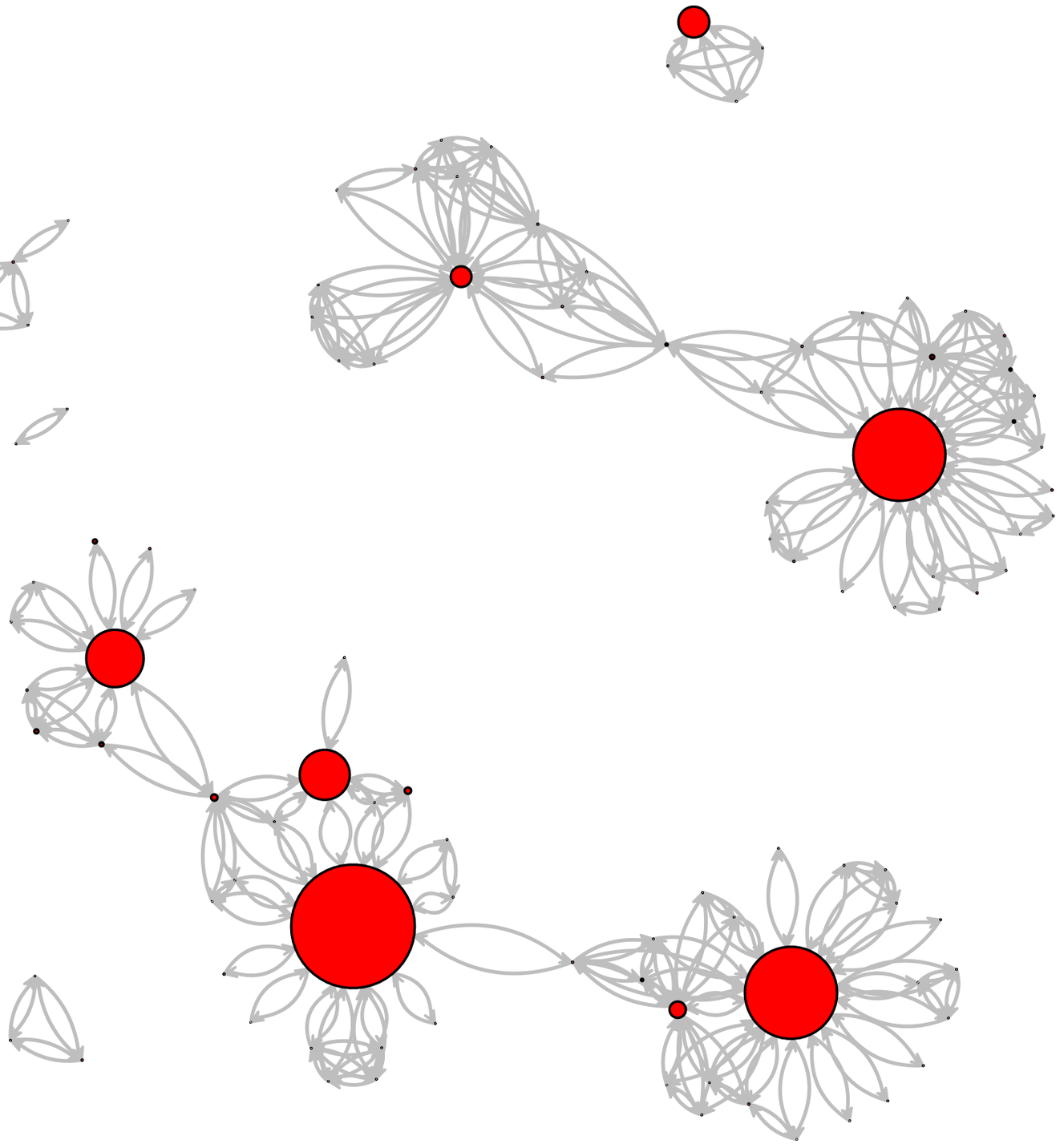
# of connections between authors in the data

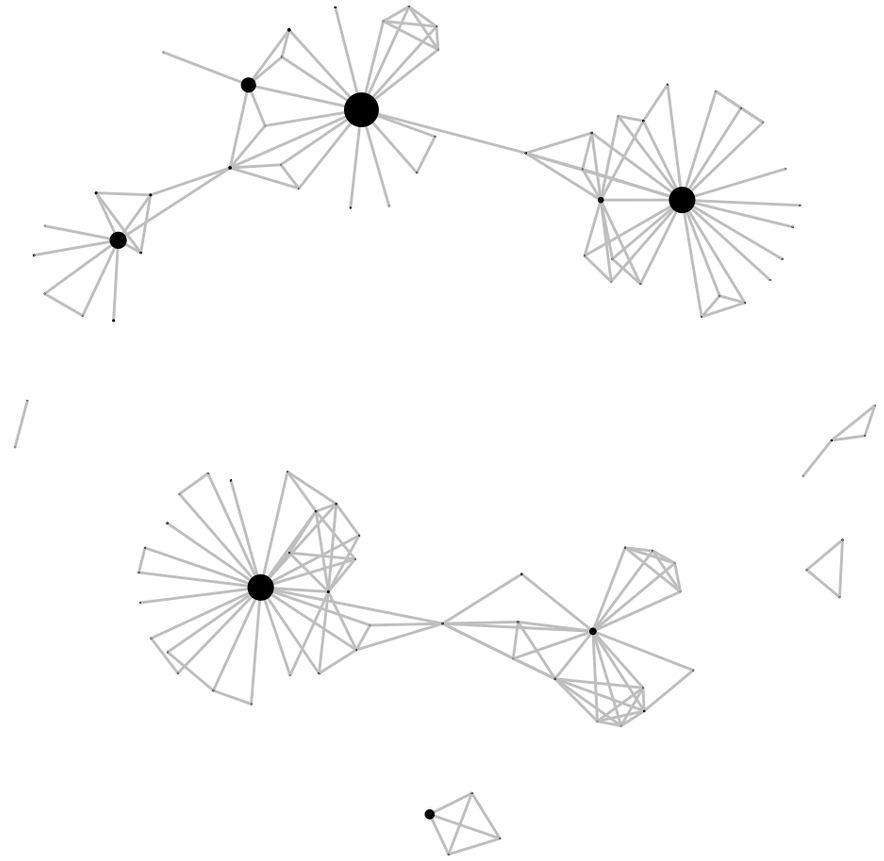
Percentage of observed connections

out of all total possible connections

```
Network attributes:
  vertices = 205
  directed = FALSE
  hyper = FALSE
  loops = FALSE
  multiple = FALSE
  bipartite = 102
 total edges = 486
   missing edges = 0
   non-missing edges = 486
 density = 0.02324247
```

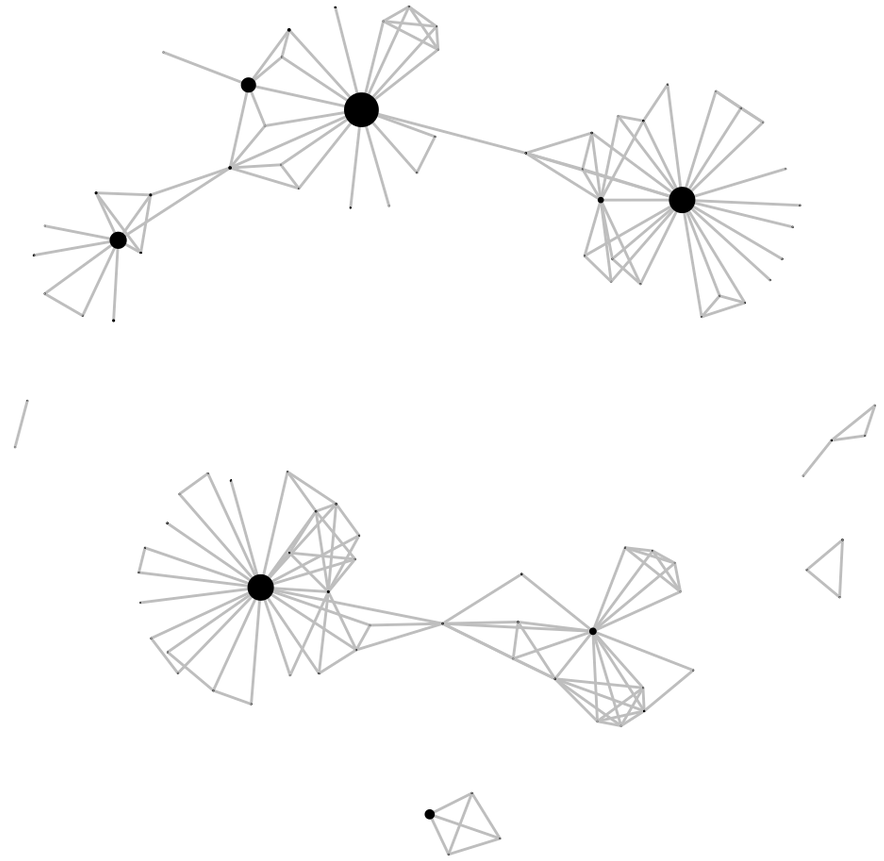
CSHPE NETWORK





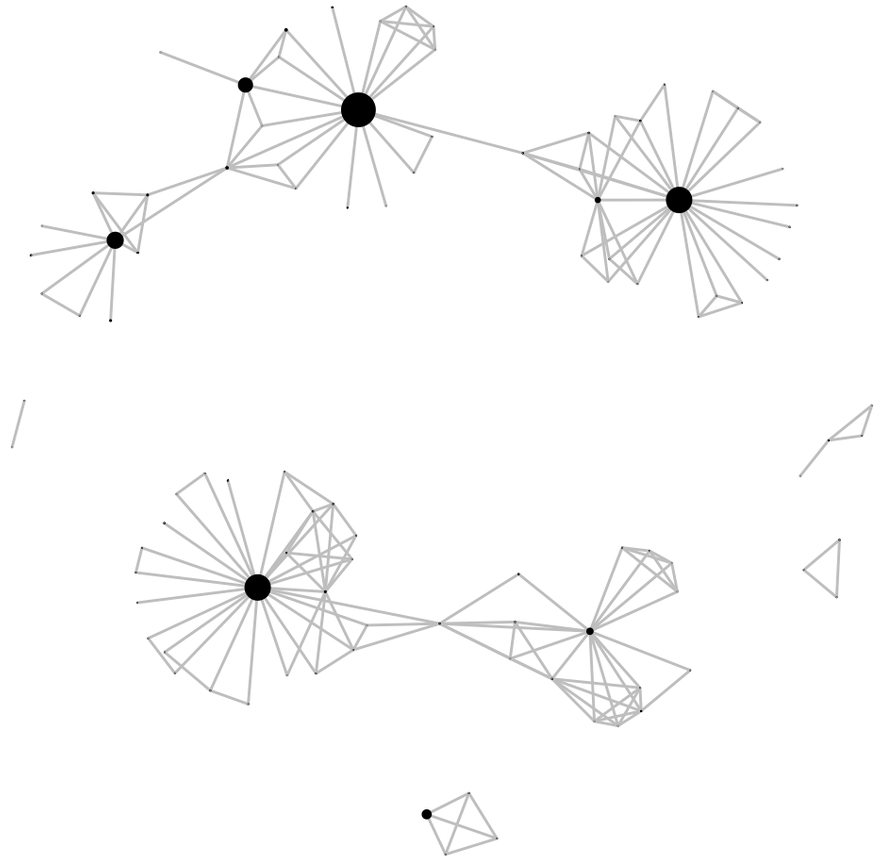
WE COULD NOW INVESTIGATE

HOW IDEAS DIFFUSE



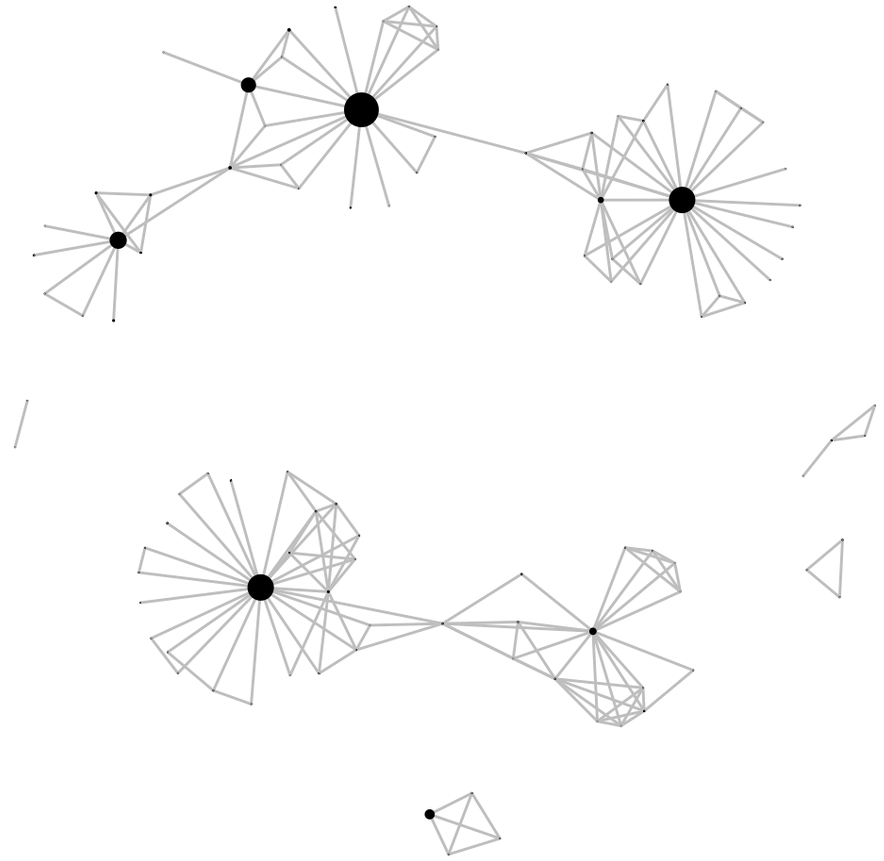
WE COULD NOW INVESTIGATE

HOW COLLABORATIONS FORM



WE COULD NOW INVESTIGATE

WHO IS MENTORING STUDENTS



WE COULD NOW INVESTIGATE

THE ROLE OF INSTITUTIONAL TIES IN RESEARCH COLLABORATIONS

Posselt, Jr	Jaquette, O	Kim, J	Kleinman, M	Samuels, E	Bowman, Na	Harris, Nf	Gumport, Pj	Lattuca, Lr	Carter, Df	Ro, Hk	Alcott, B	Magolda, Mt	Perez, Rj	Shim, W	King, Pm	Hyman, Jm	Dynarski, Sm	Hemelt, Sw	Terenzini, Pt	Me
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Let's Make An

ADJACENCY MATRIX