Cheating at Keyword Bingo

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About us (BDSG)

BDSG = team of UCB DS instructors, and Alumni originally founded with the goal of bringing MIDS work to market, and later developing into:

- consulting/DSaaS biz

- working with a range of customers, including Fortune 500's

Project Pigeon

Have you ever tried to get a job interview with a resume?

Resume tuning

- What skills are employers actually looking for ?
- Which keywords are required for which jobs?
- Which keywords go together (complementary)
- Which keywords can be trimmed (interchangeable)

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History

- TF-IDF, too simplistic
  - Hyperdimensional TF-IDF
  - A lot of operations
  - Actually a graph problem
- This is actually a graph problem
  - Moved to graph analysis using GRAKN.ai

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Exchangeable relationships

- Which keywords can be trimmed (exchangeable)?
- Which of a pair matches with the target jobs?
  - R and Python C++ and JAVA

Complementary relationships

- Which keywords go together (complementary)
- Web development + JAVA

Data from actual job postings

- Keyword bank
- Keywords commonly associated
- Job title data and patterns

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Graph and NLP analysis

- Multiple public data stores
- Job description ontologies
- Want ads
- Resume
- Collaboration records

Job related Data:

51,700
Job Skills on LinkedIn

—

20,000 (Jobs /major metro area /job title)

—

2,000,000
Relationships to score, per search, after cleaning data

Publication Data:

24,000,000
Full PubMed Dataset (all lit)

—

2,900,000 (~1.5 Million Open Source)
PubMed Central (BioTech -open access subset)

—

1,219,850
Total Entries, Condensed, after Cleaning/Pre-Processing

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A mobile interface – for job seekers

- What are your resume keywords?
- What are you applying for?
- What other titles should you consider?
- Terms that should be added?
- Terms that should be removed

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A mobile interface – for recruiters

- What are the current trends in hiring?
- How does a candidate match up?
- What should they get better at?
- Are there other types of jobs to consider?

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A mobile interface – for employers

- Which domain is the scientist candidate really an expert in?
- Are they a good collaborator?
- What do their collaborators know?

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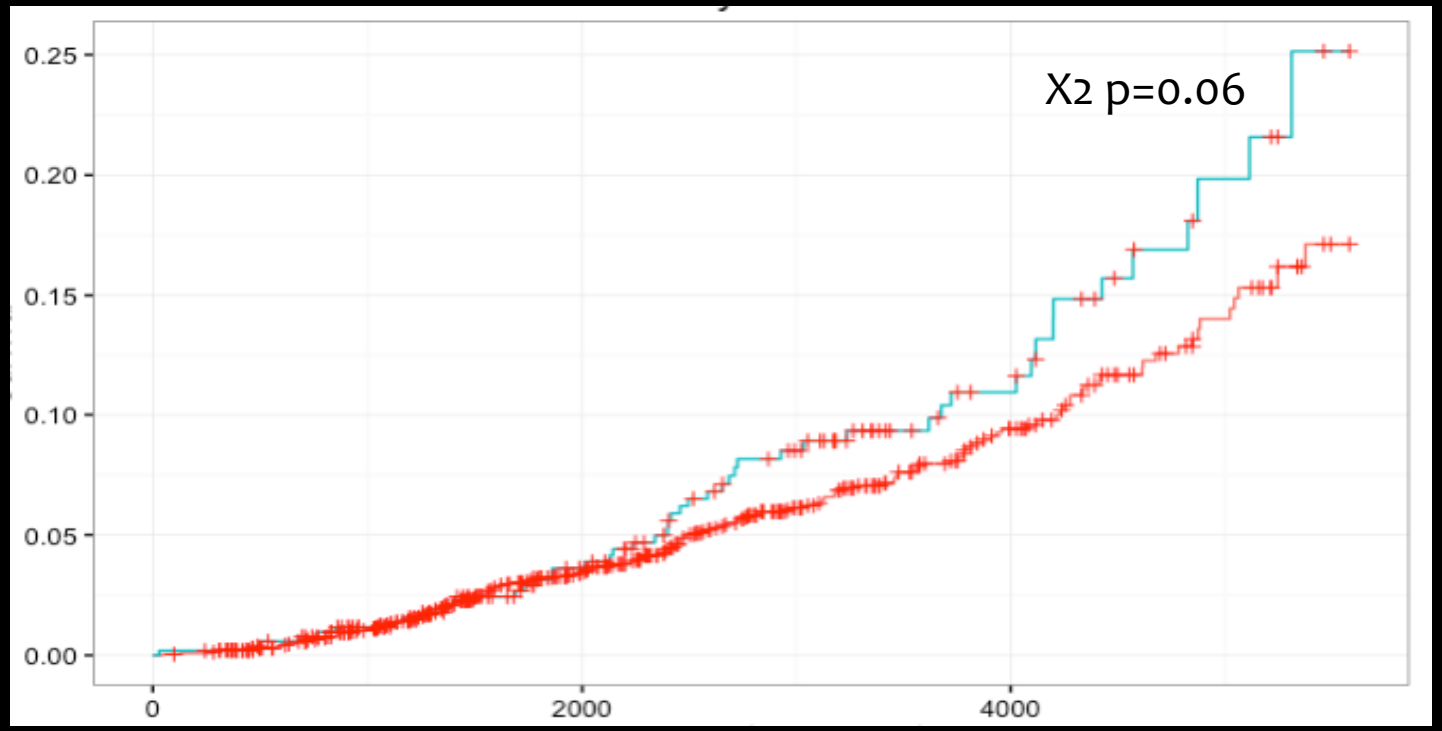
Have you ever wondered what type partner a new collaborator will be?

Teams with more scientists IPO faster



> 50% scientists

fewer or no scientists

BDSG biotech sector analysis BioPredictor

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But how do we judge scientists?

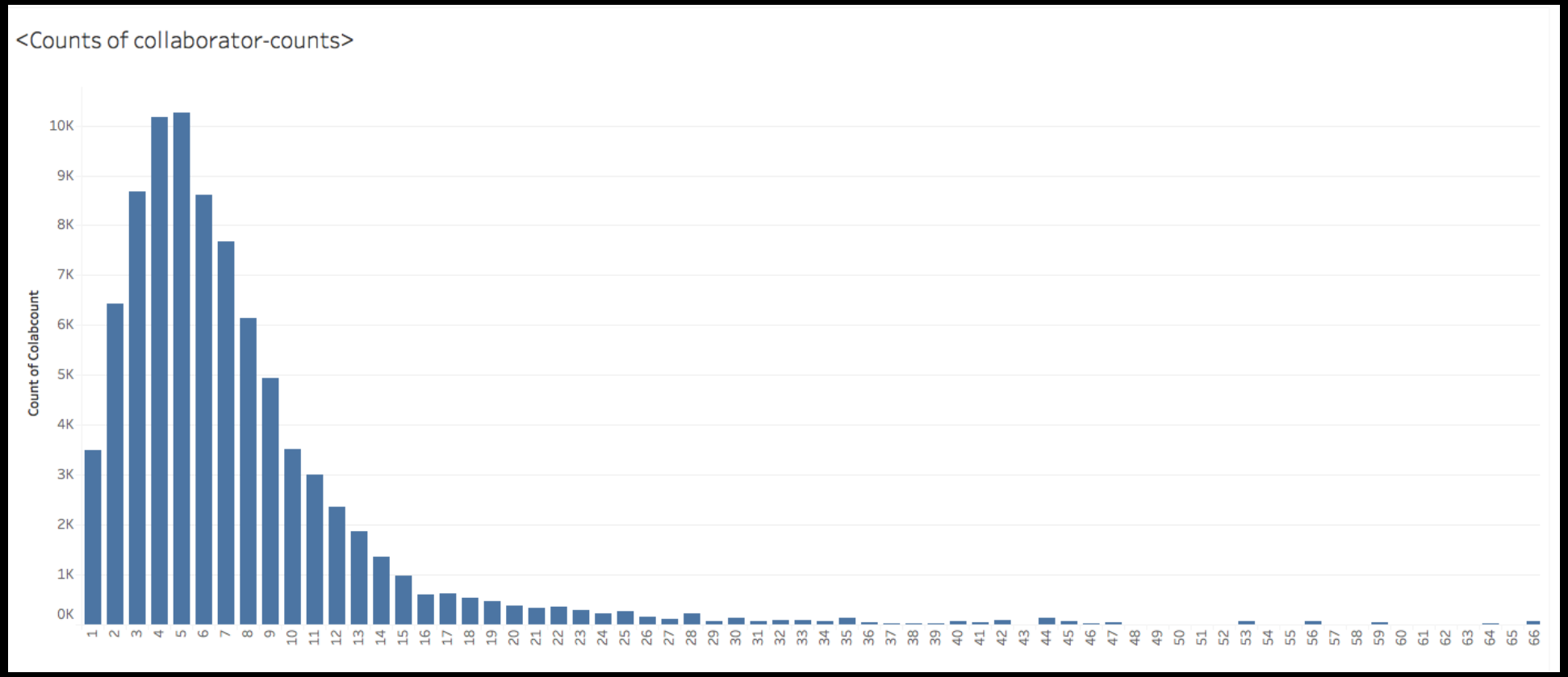
- Paper count
- Journal impact factor
- Citations
- Inside information
- Interviews

** Either expensive or basic **

What about their true expertise?

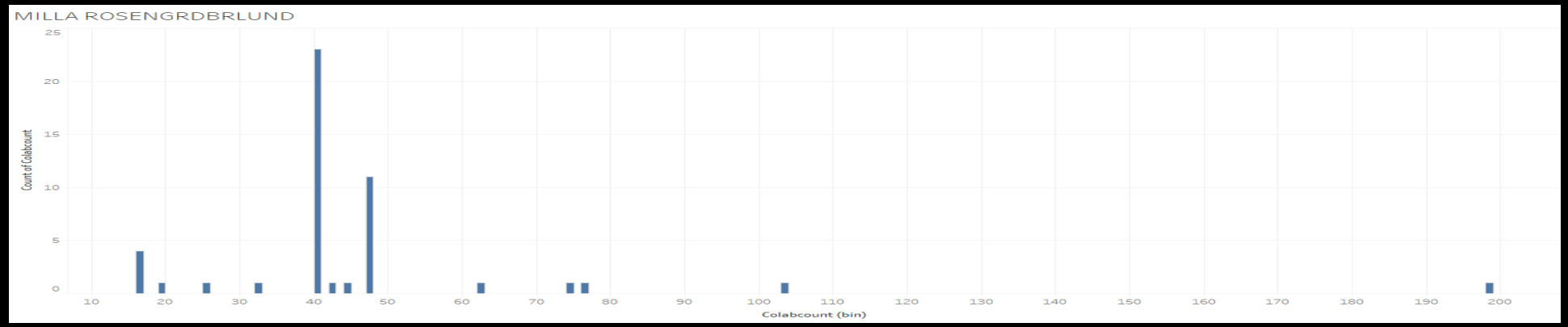
What about their network?

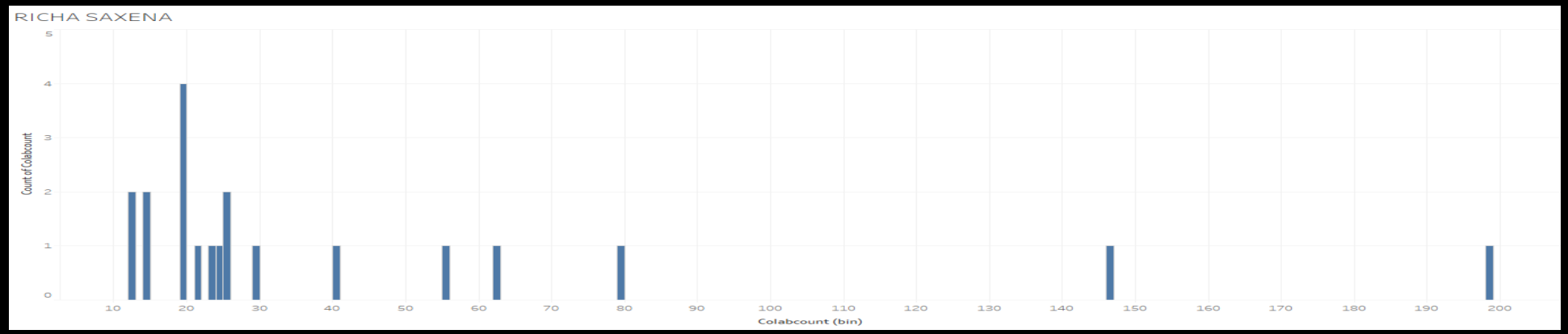
Paper counts per scientist globally



Individual's collaborator density distribution

of collaborators





paper counts per collaborator

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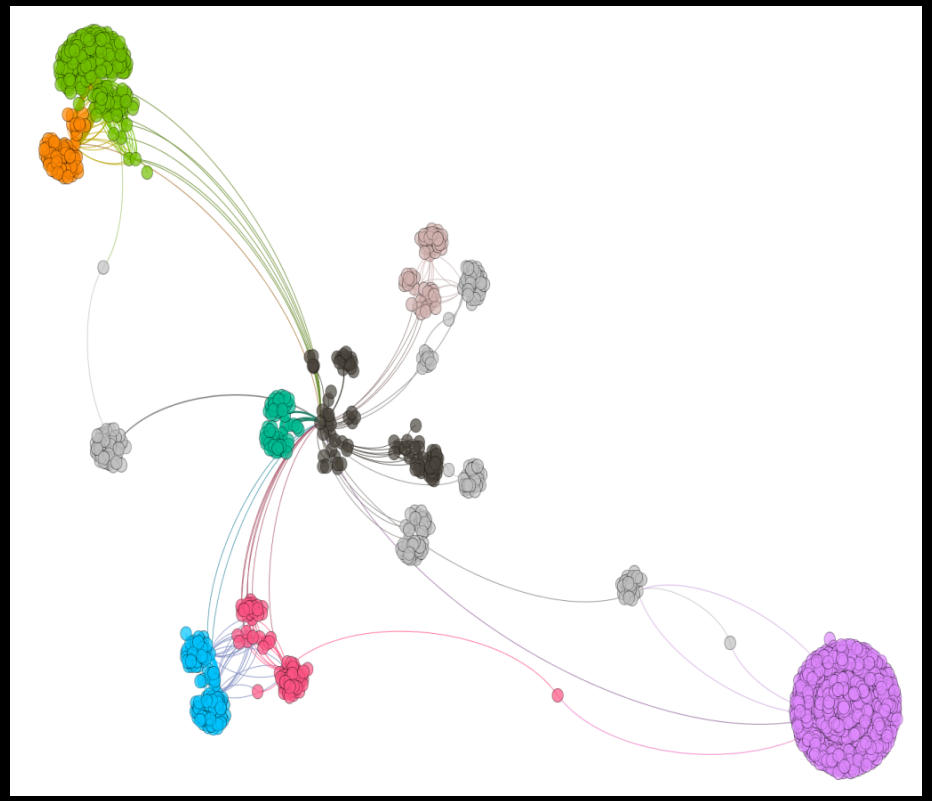
Analysis of publication record can give answers

- A rich record of behavior
- Collaboration record
- Rich long term record of performance
- Record of alliances
- Expertise is coded in the network



Building the collaboration graph in 3 layers

- Person 1

Primary

Secondary

Tertiary

- 

Primary paper

Secondary paper

Tertiary paper

https://www.iconfinder.com

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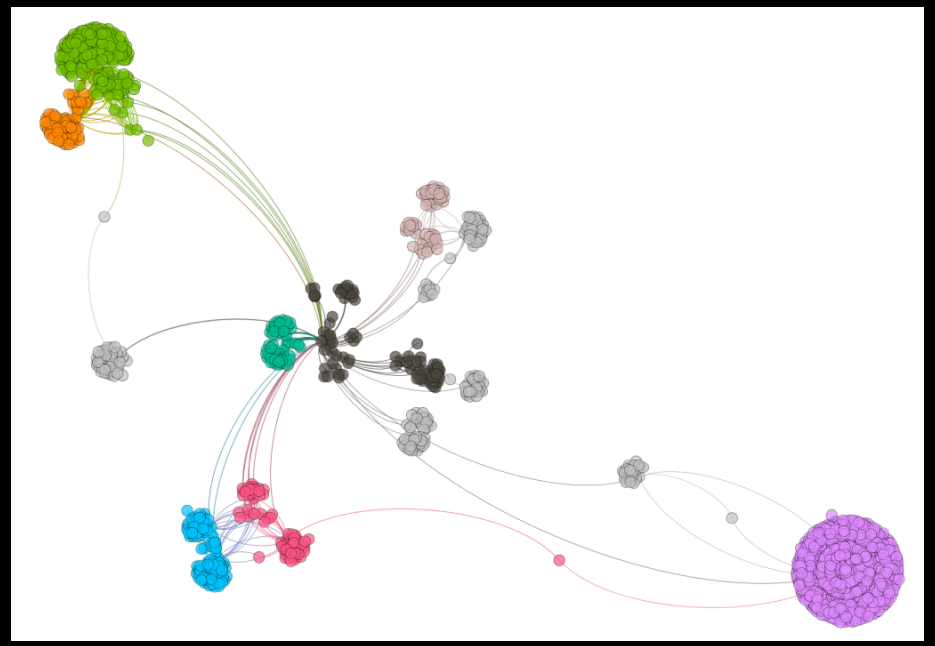
Consider the most prolific publishers

n	COUNT(r)
Node[487153]{name:"THE "}	2671
Node[865318]{name:"GUNTHER EYSENBACH"}	2055
Node[78005]{name:"HOONGKUN FUN"}	1329
Node[1520956]{name:"SEIK WENG NG"}	1233
Node[12886]{name:"WEI WANG"}	1203
Node[33084]{name:"WEI ZHANG"}	1029
Node[148]{name:"YAN LI"}	829
Node[6653]{name:"WEI LI"}	778
Node[15555]{name:"JING WANG"}	737
Node[20702]{name:"LI ZHANG"}	670

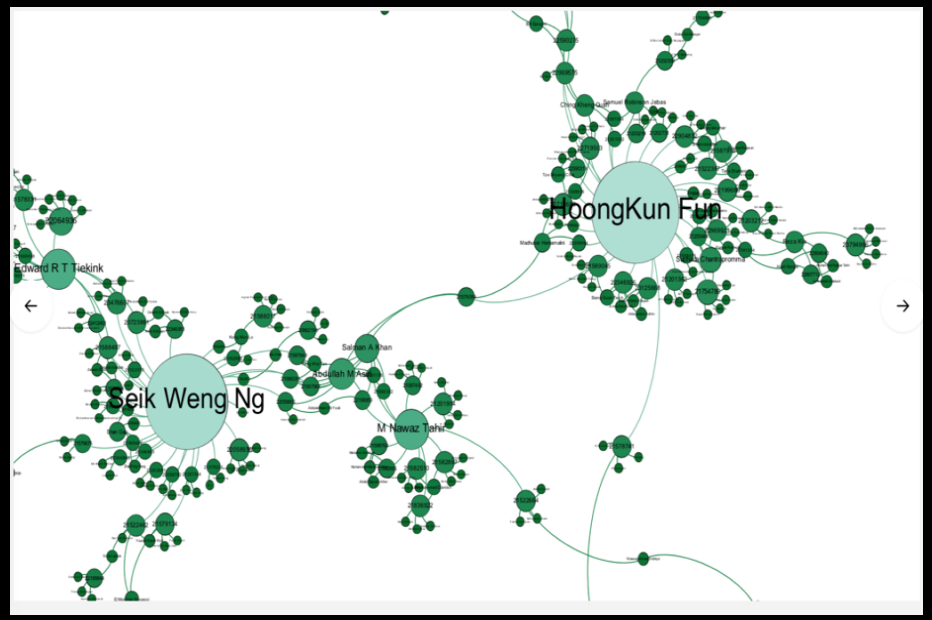
10 rows
24526 ms

Different collaboration patterns

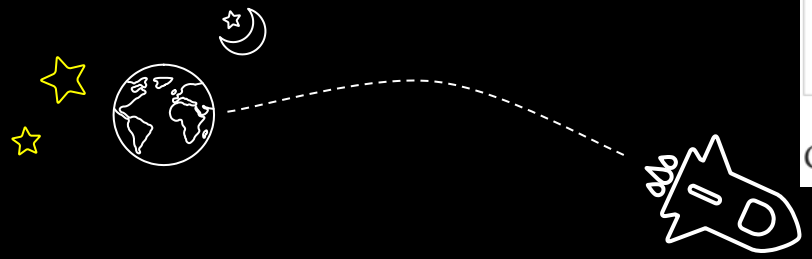
Gunther Eysenbach



Seik Weng Ng and HongKun Fun

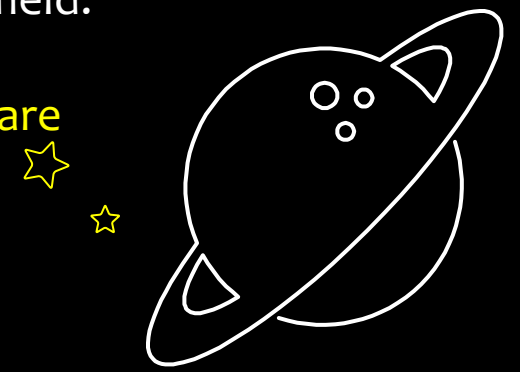


A Big publisher with 2055 links!



“one of the most productive researchers, editors, and publishers in the online health field.”

in 2004 received the Janssen-Cilag Future Award, referred to as the German “health care nobel prize”.



Founder of an academic field!

- association between search engine queries and influenza incidence,
- He coined the terms **"infoveillance" and "infodemiology"** for these kinds of approaches.

Source: http://ehealthinnovation.org/people/gunther-eysenbach/

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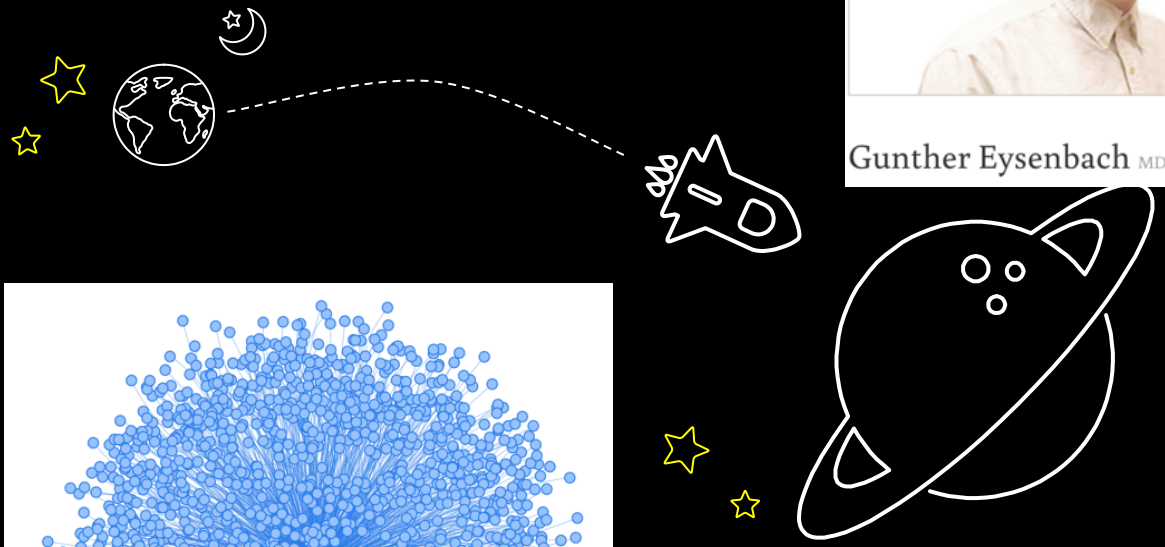
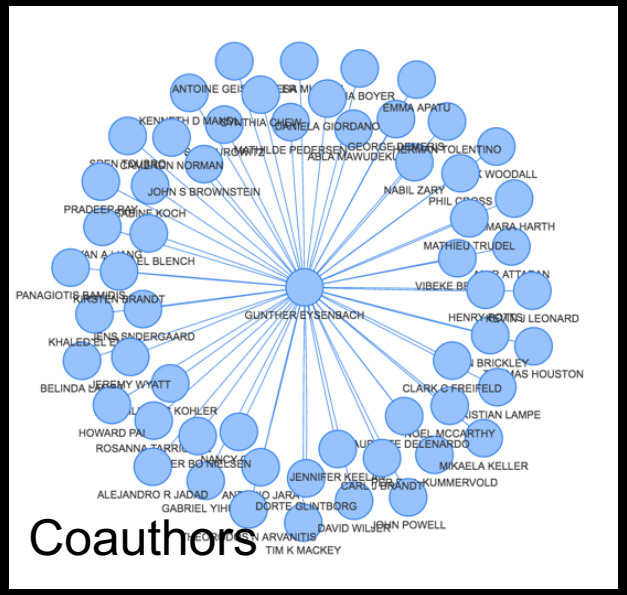
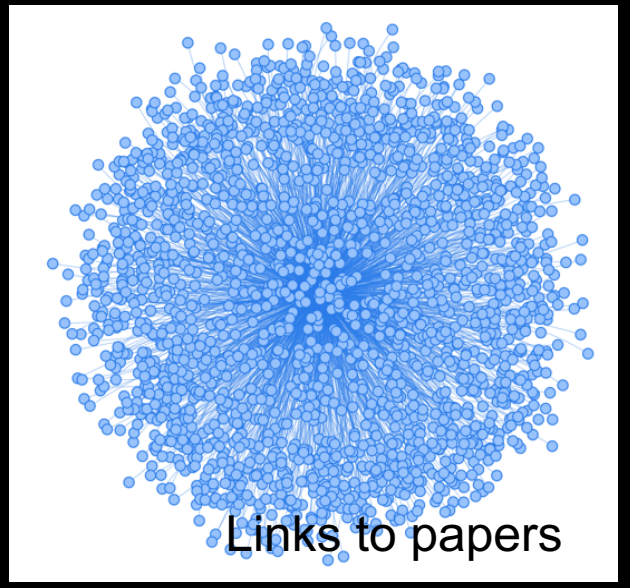
Prof Eisenbach has a pattern that is interesting



Many collaborators
Few publications





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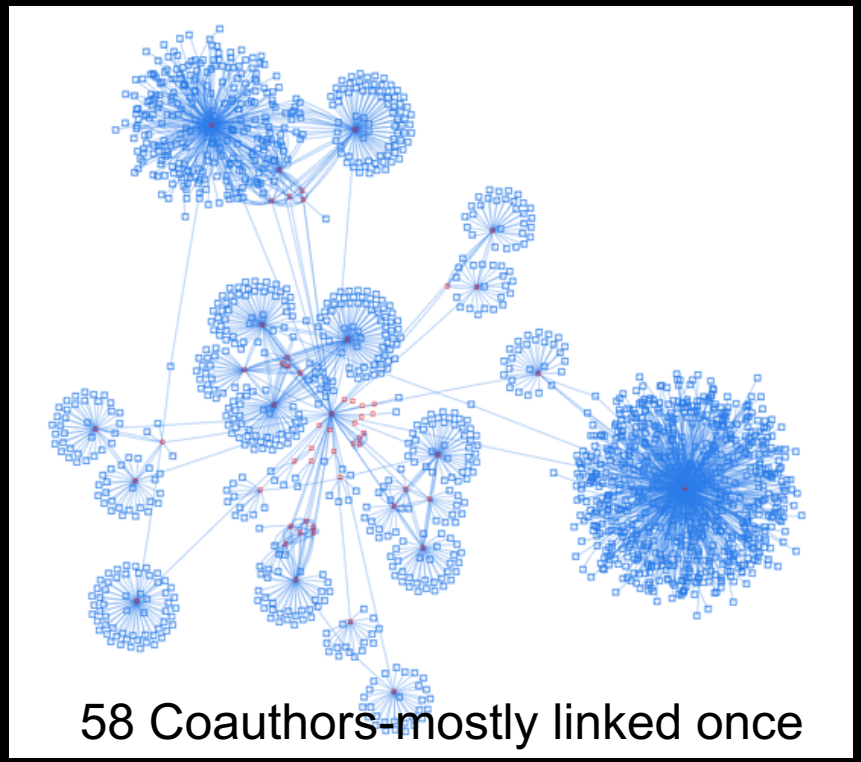
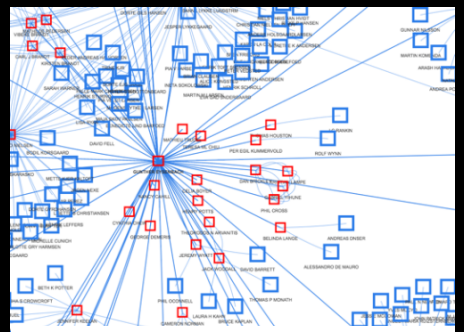
Limited collaboration and a sparse network

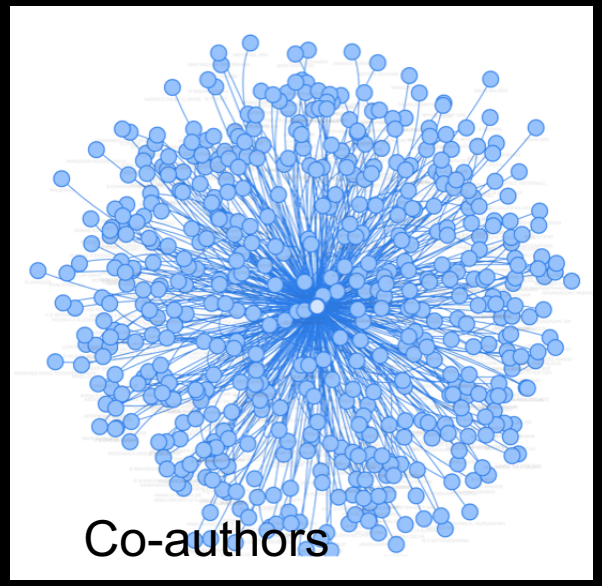

58 Coauthors-mostly linked once

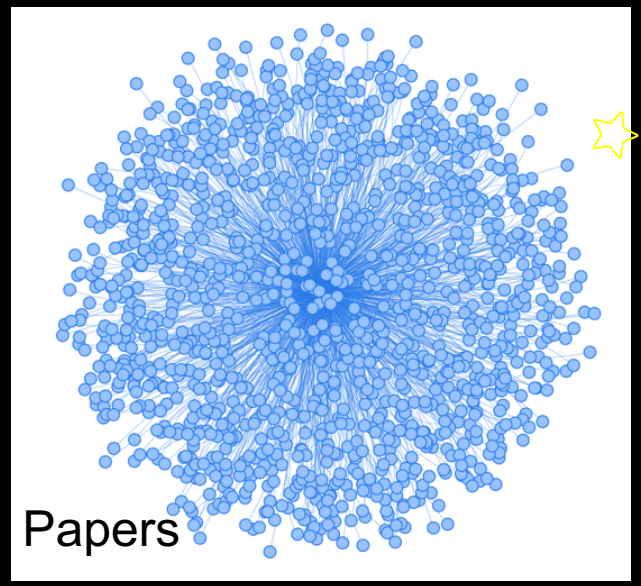

primary connections in red

About half of his papers appear to be written by him alone!

Prof Kun has a pattern closer to what we expected

Many collaborators and many publications

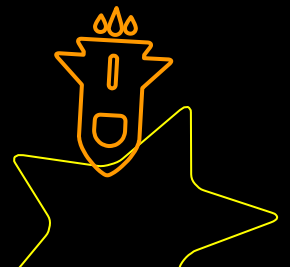




But there is there is something missing?

Gunther is a star, but he is only cited for 120 papers and 40 book chapters.

So what are those other 1900 links?
* Edited papers



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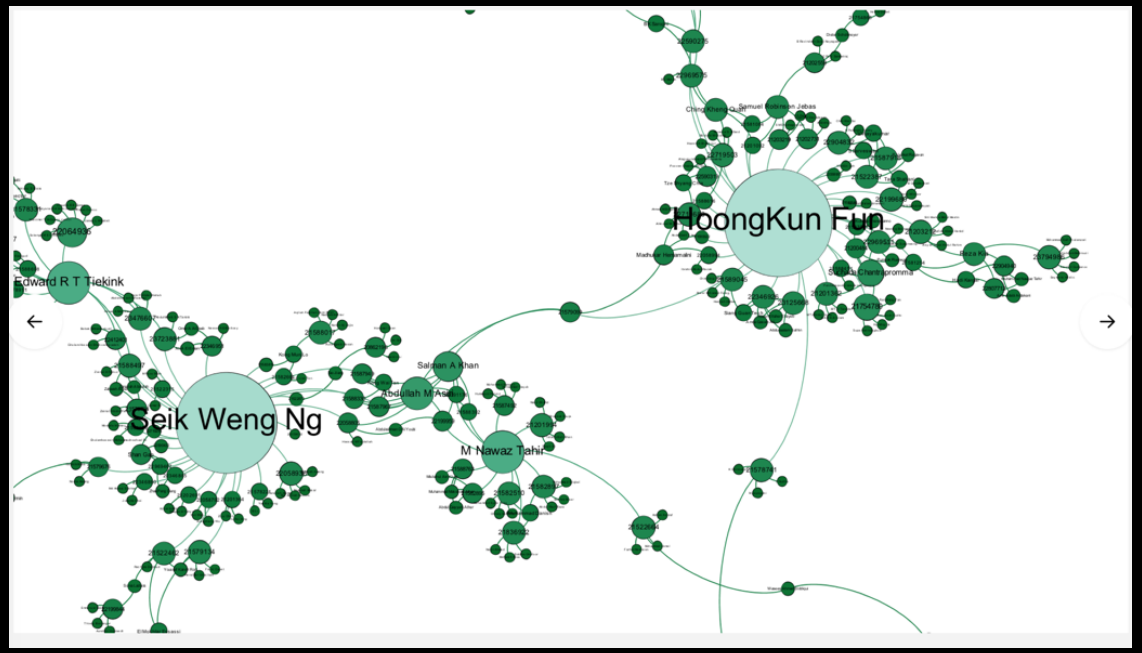
The NEW biggest publisher

- Highly collaborative
- Has co-authored > 2000 papers
- Independent identification from sub-setting and total dataset approach

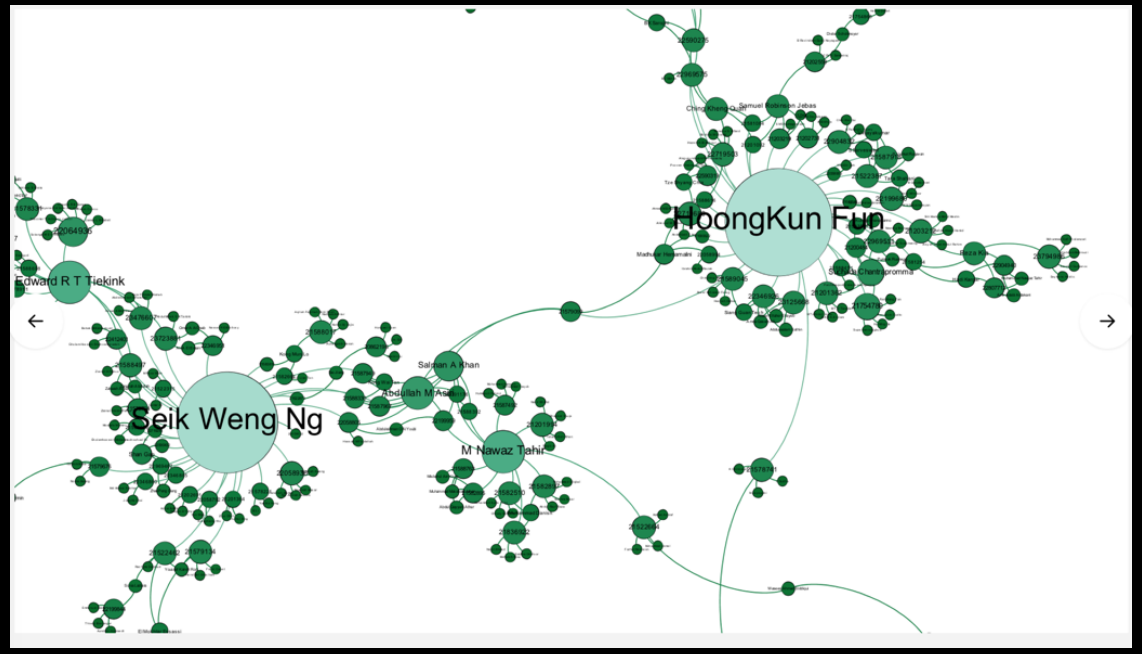


Highly collaborative X-ray crystallographer

- *Prof. Fun has published more than 2618 Science-Citation-Indexed (SCI) papers*
- *collaborating mainly with researchers from China,Taiwan, Thailand, India, Pakistan, Iran, Iraq, Japan, Egypt and Saudi Arabia. Under his supervision, this research group has solved a few thousand structures.*

There is more to the Prof. Kun Story

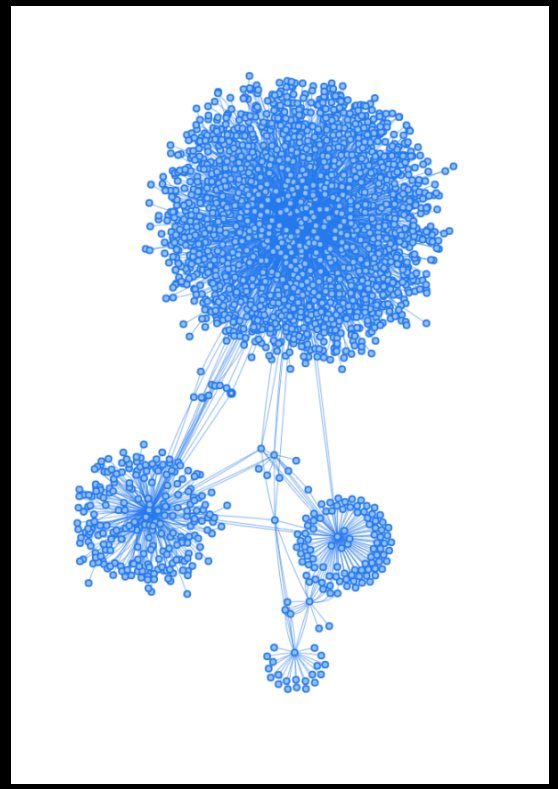
- **The two of the biggest publishers look very similar**



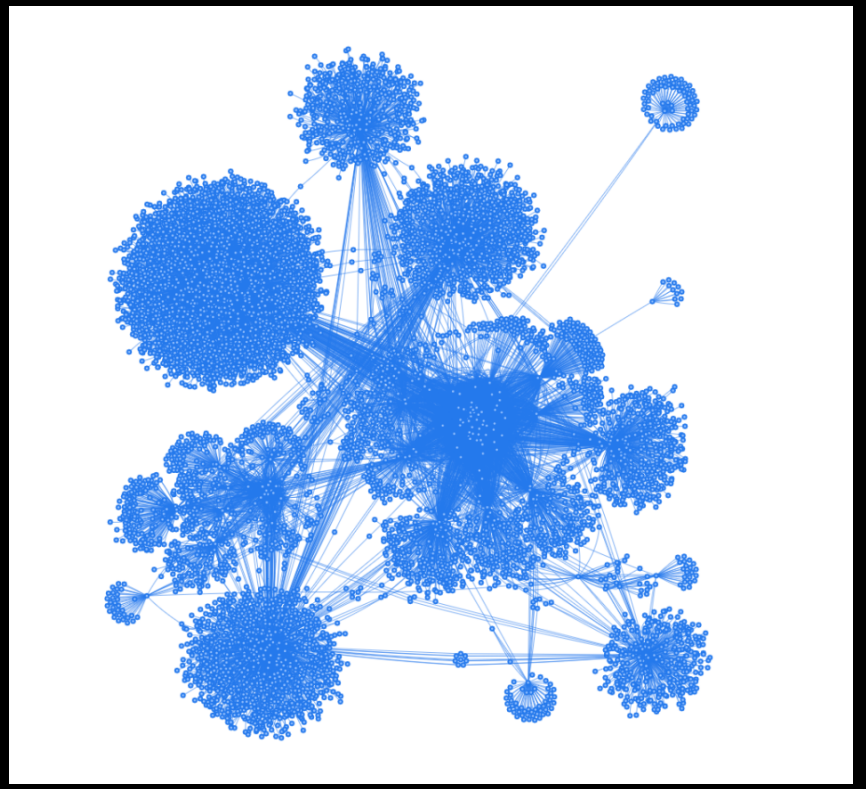

```
{name:"GUNTHER EYSENBACH"} | 2055
name:"HOONGKUN FUN"}       | 1329
]{name:"SEIK WENG NG"}     | 1233
```

Given some networks of interest

Scott W Emmons



Coleen Murphy



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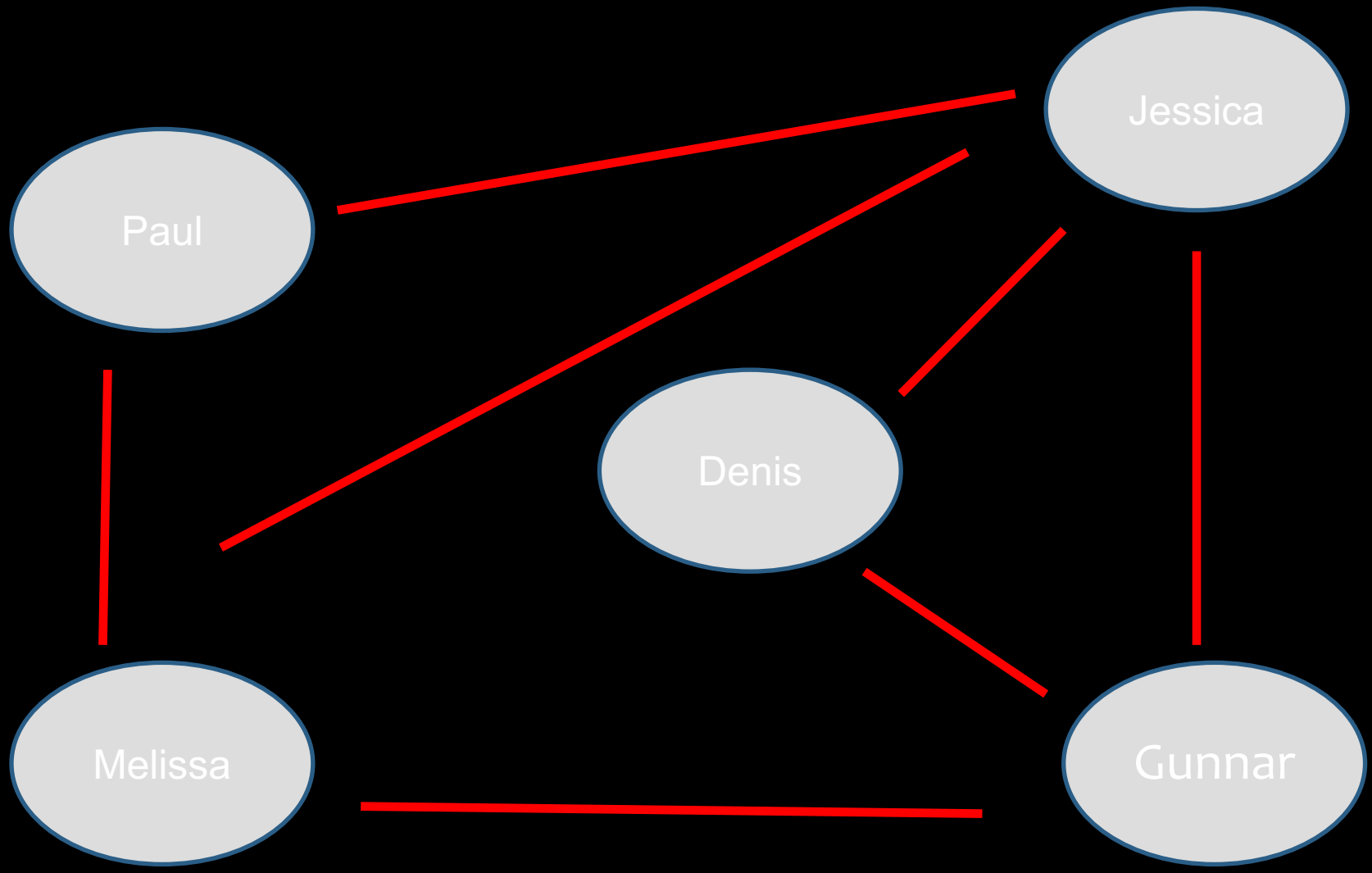
How can we assess these networks systematically?

Definitions

Consider a simple social network



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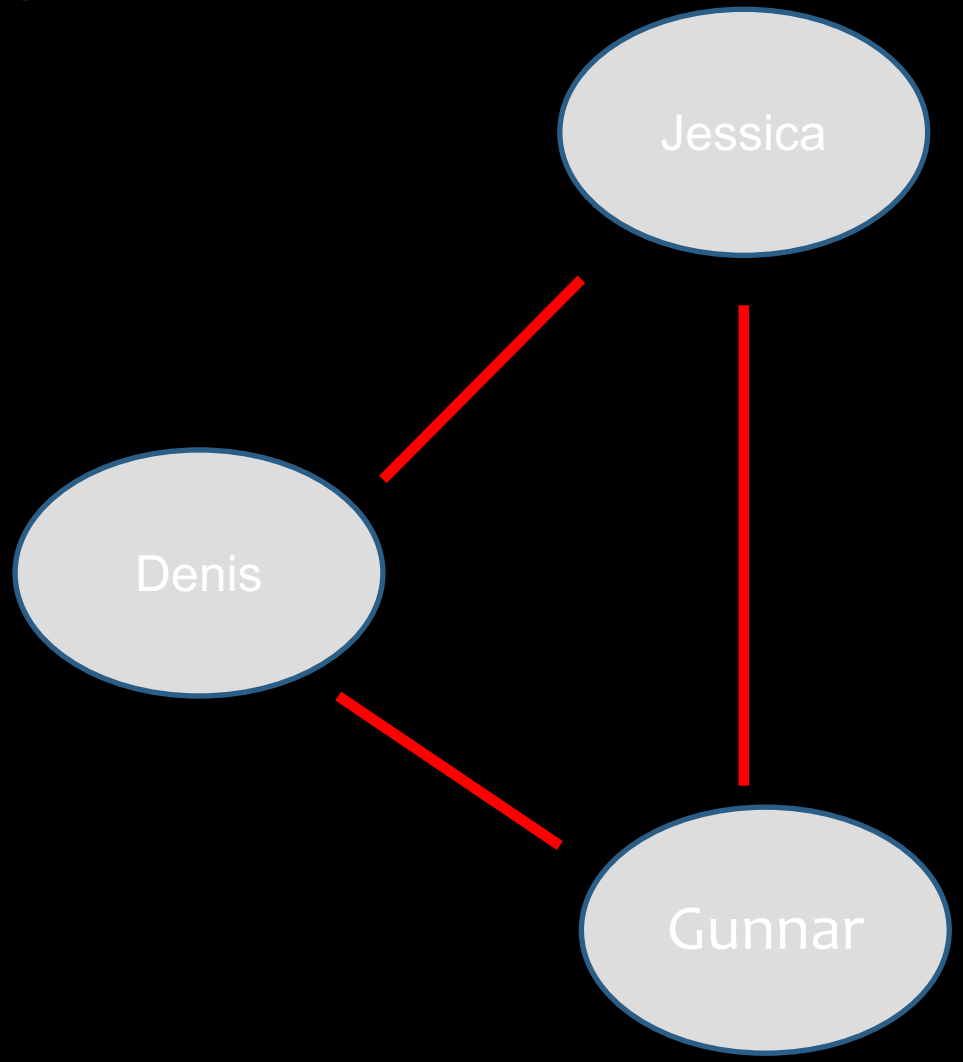
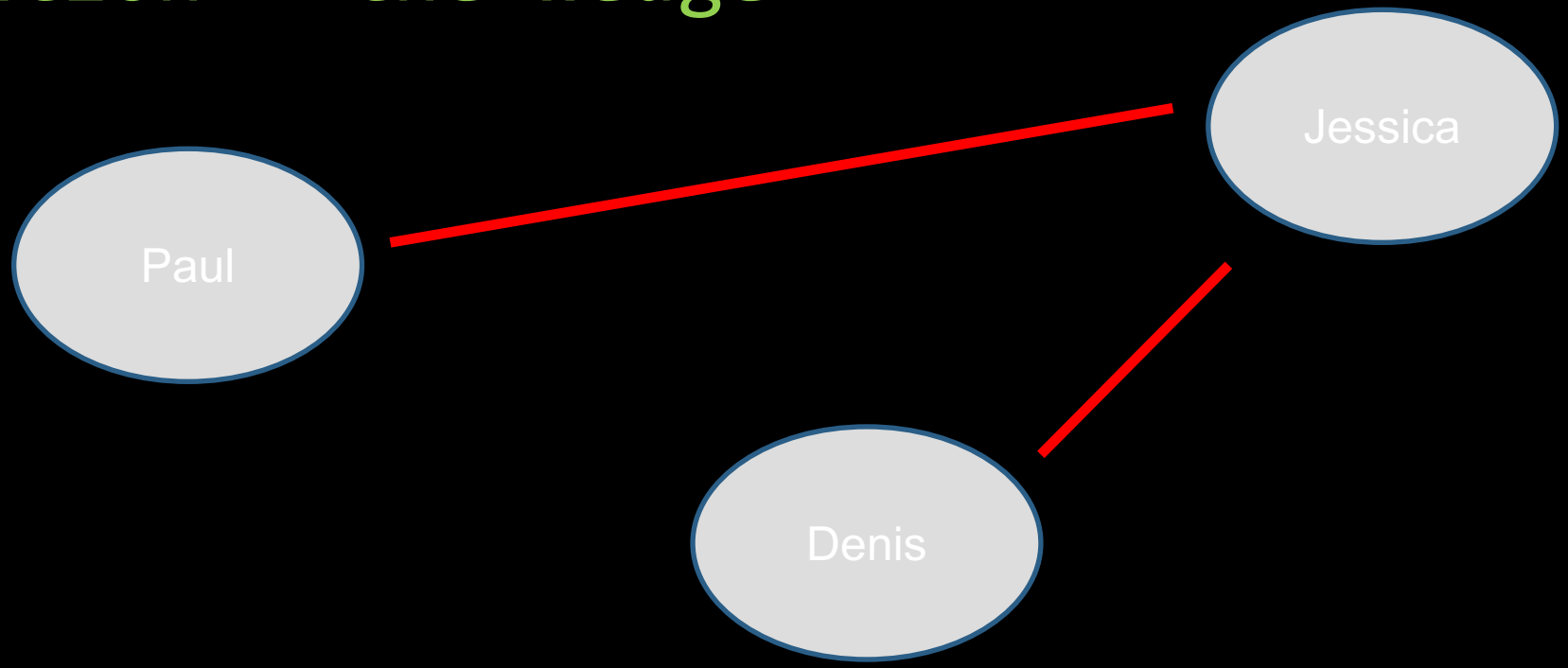
Definition – Triangle



Definition – the wedge



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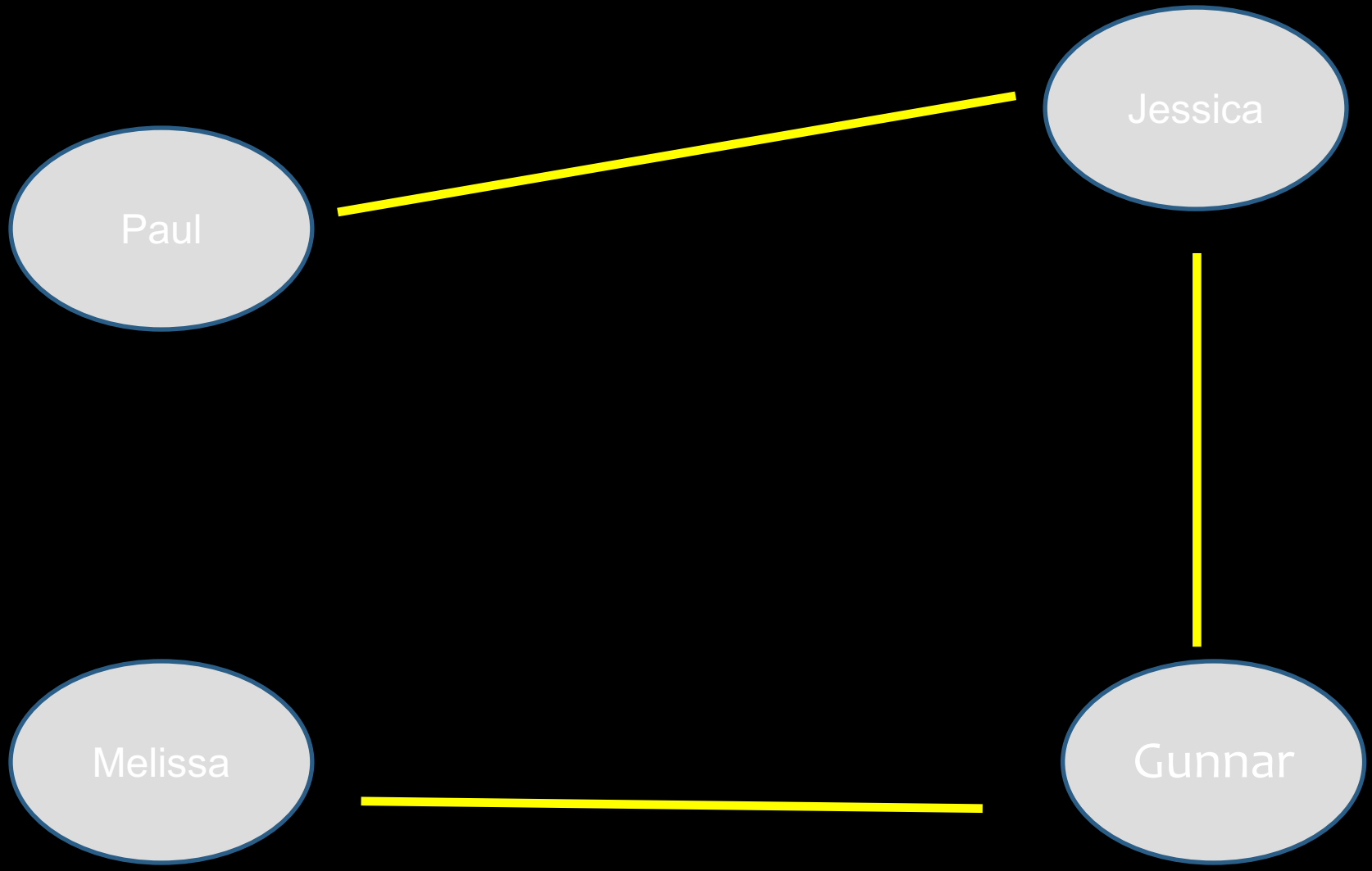
A wedge - third is not self



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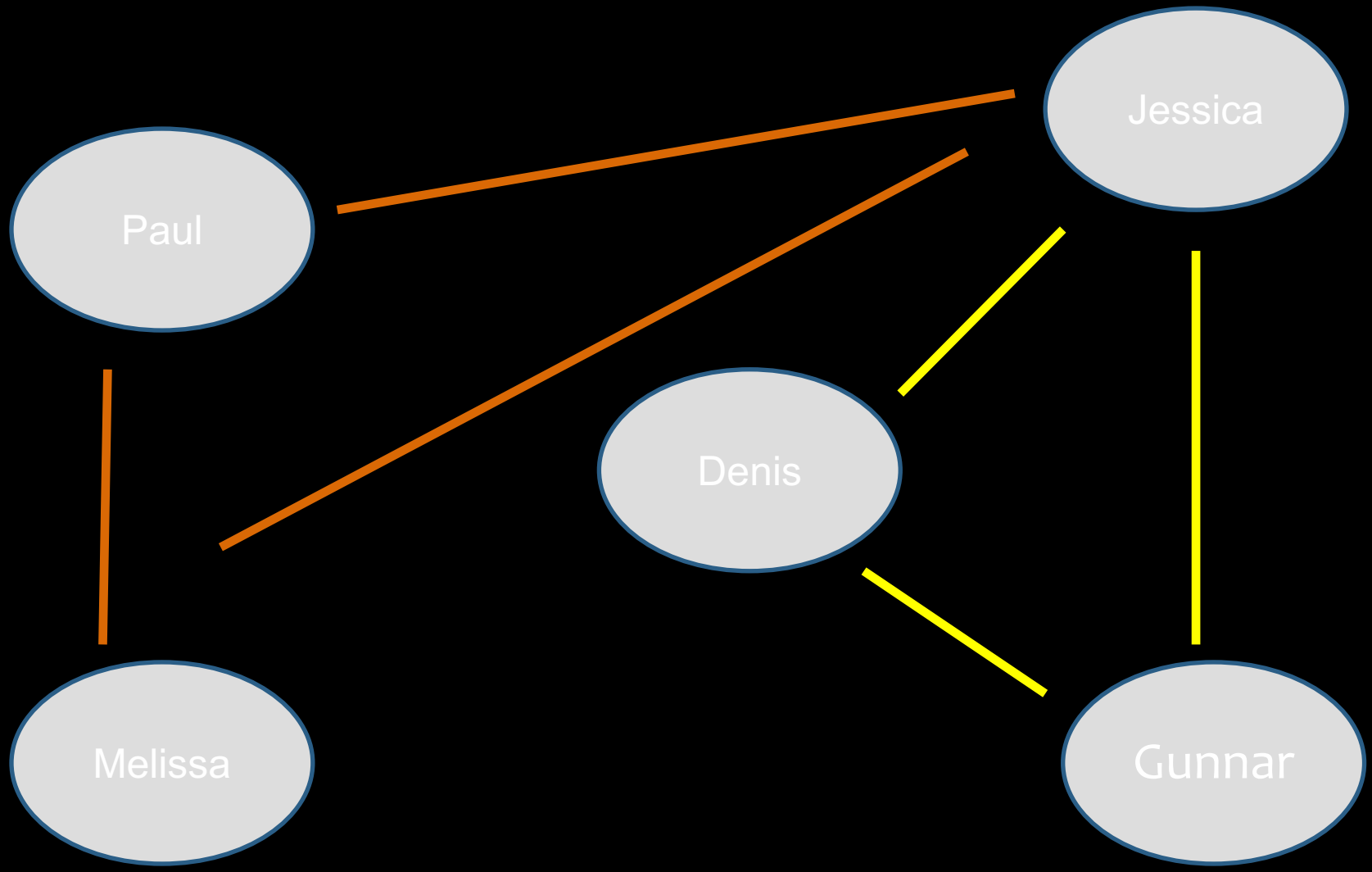
Two triangles – third is self



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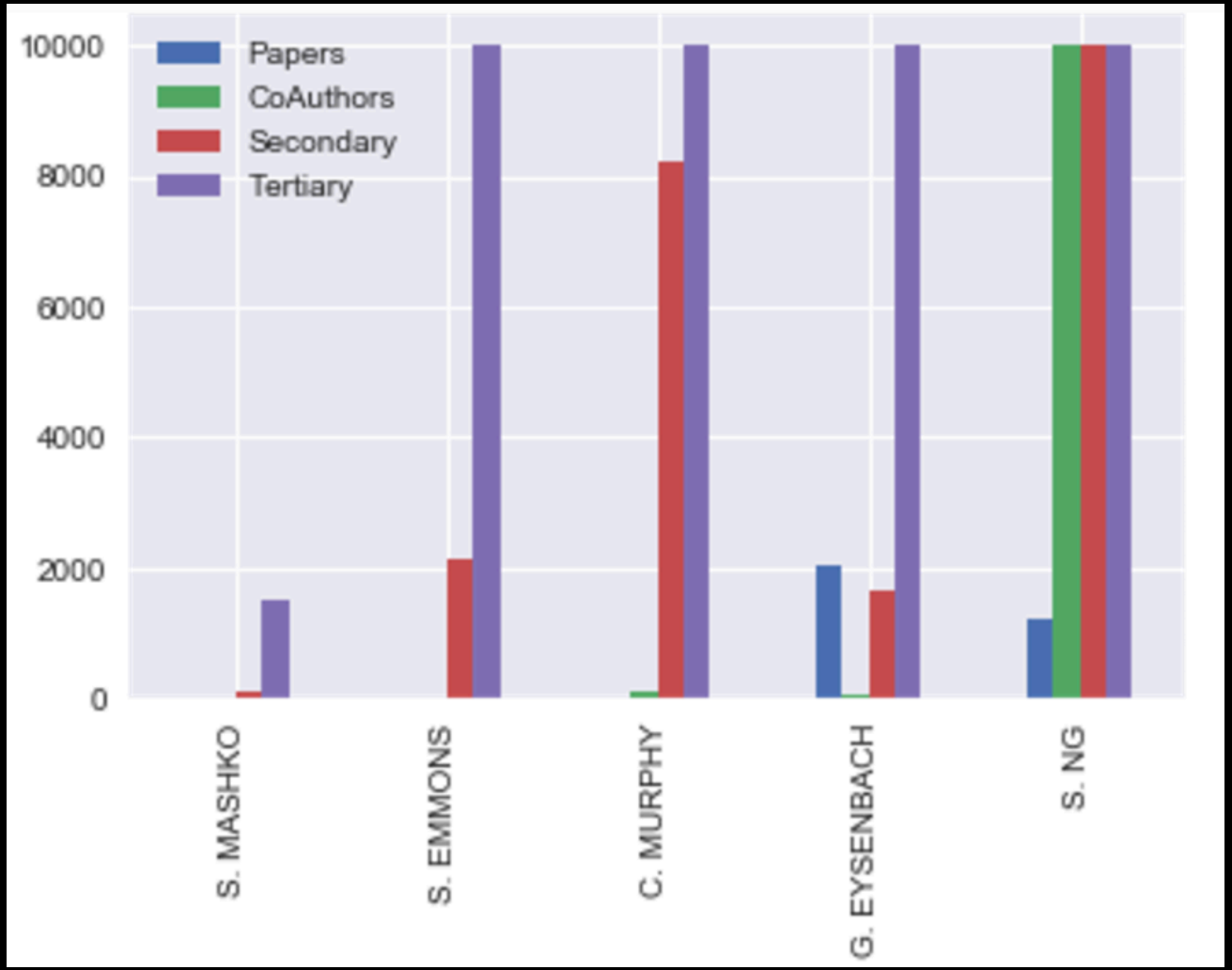
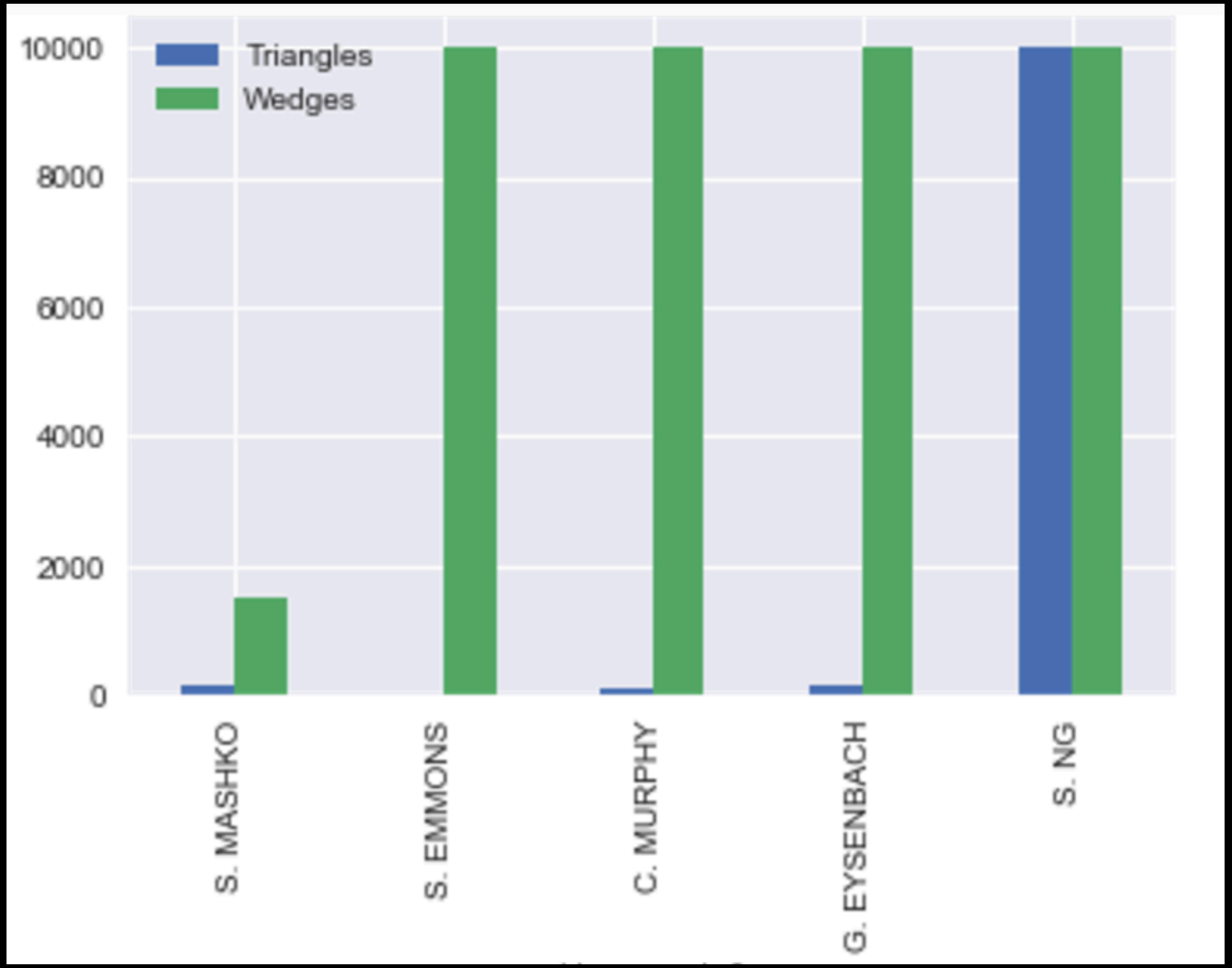
Graph traversal-collaboration patterns

Paper count at three levels



Graph traversal-collaboration patterns

Triangles vs Wedges



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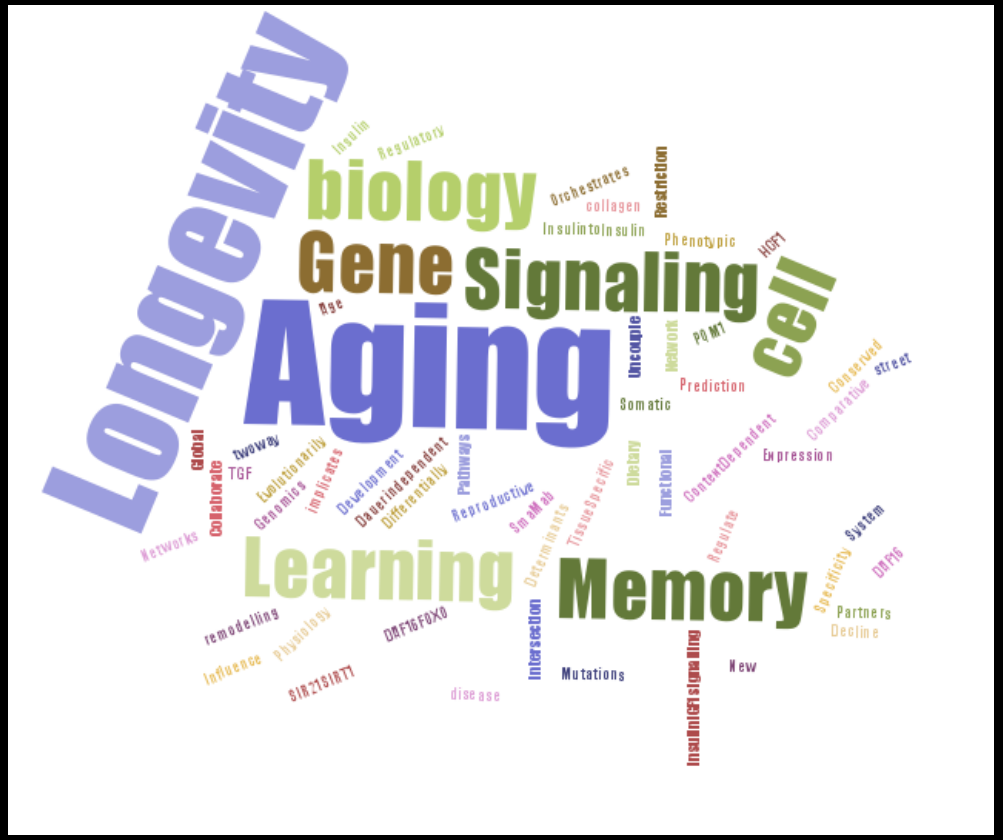
Title clouds – what do they know?



- https://www.flickr.com/photos/utasel/6961732976

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Title clouds – what do their friends know

Secondary title cloud

Tertiary title cloud

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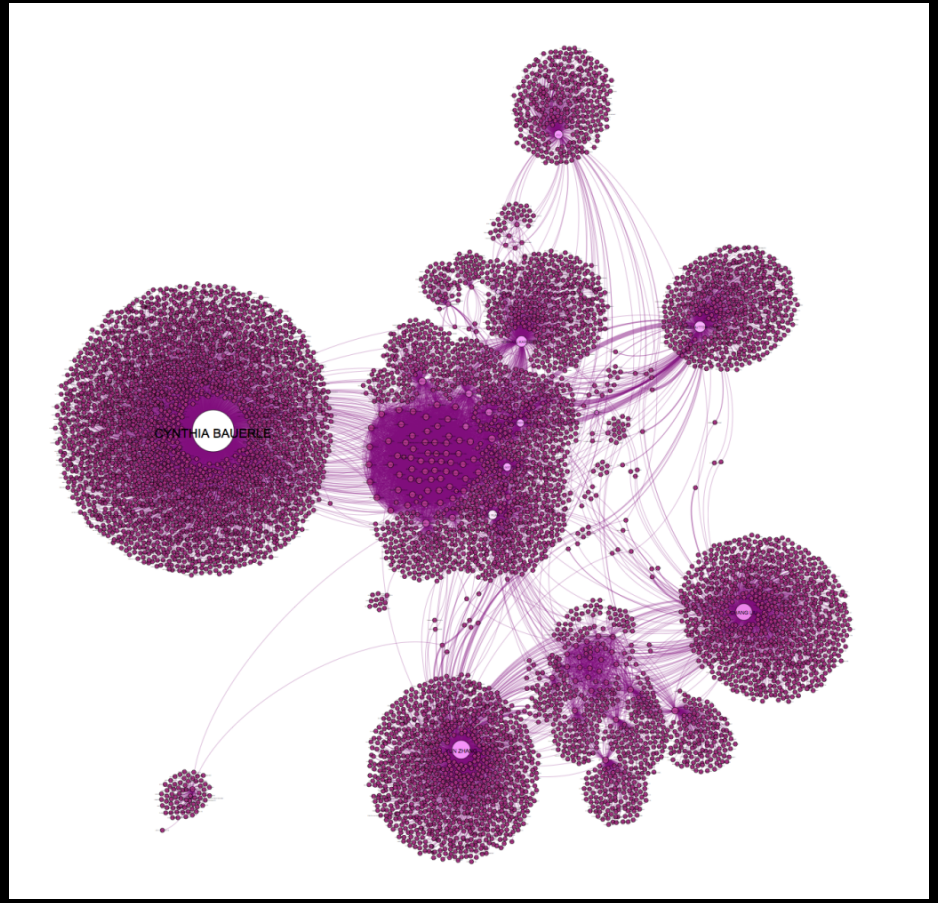
Collaboration Statistics

Collaborators
Primary : 75
Secondary : 8000
Tertiary : <10000

Papers
Primary : 55
Secondary : 2000
Tertiary : 5000

Network
Wedges to triangle ratio: >10000
Title word count (primary): 235



Ongoing projects and collaborations

SciLit

MarketGraph

BioPredictor

Project “Pigeon”

ParlourBoard

Red Sands Robotics

About us (Speakers)

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Thank you

Questions?