Data & Visual Analytics

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CSE 6242 A / CS 4803 DVA

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I Work with Large Graphs

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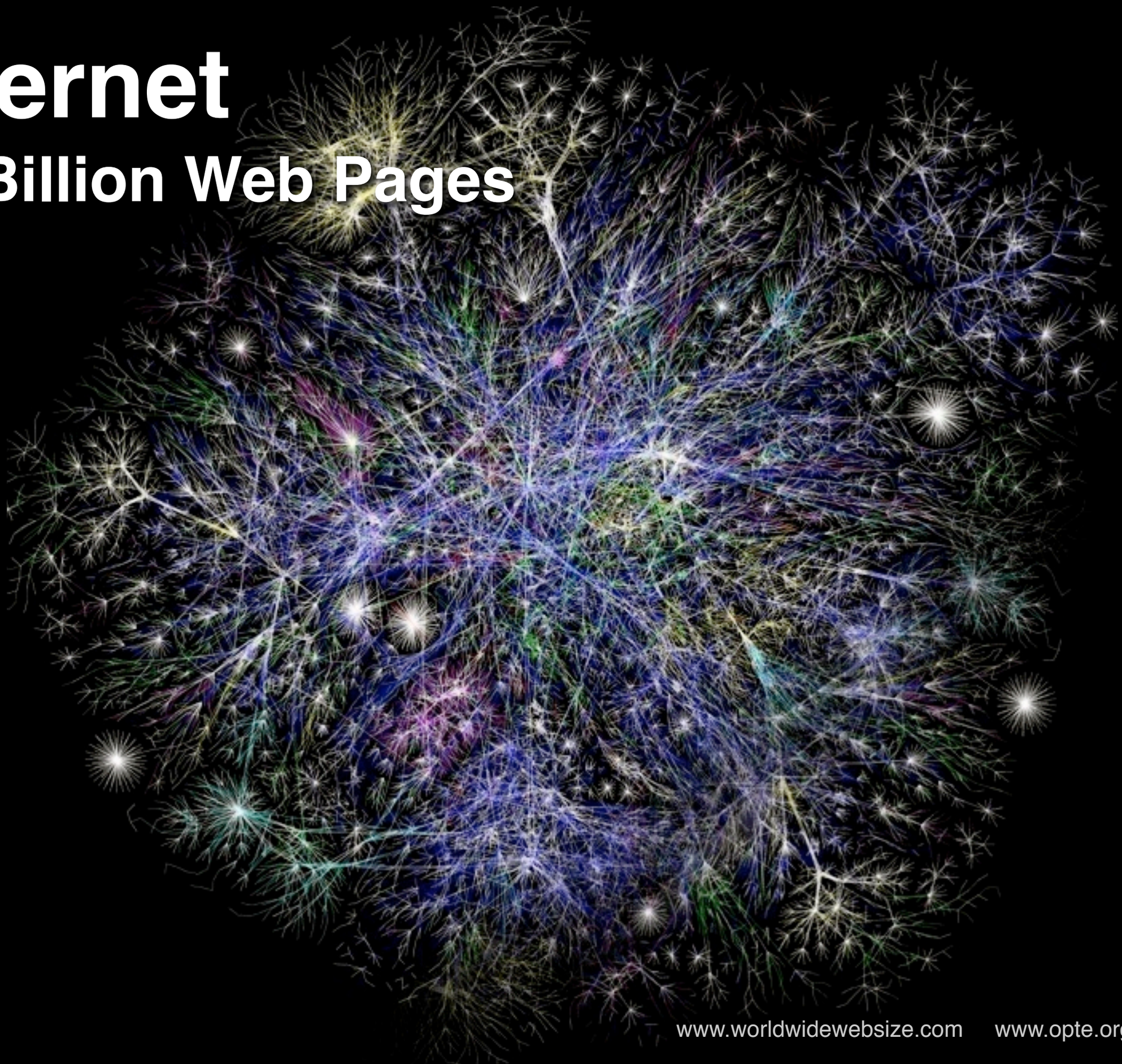
= Large Network Data

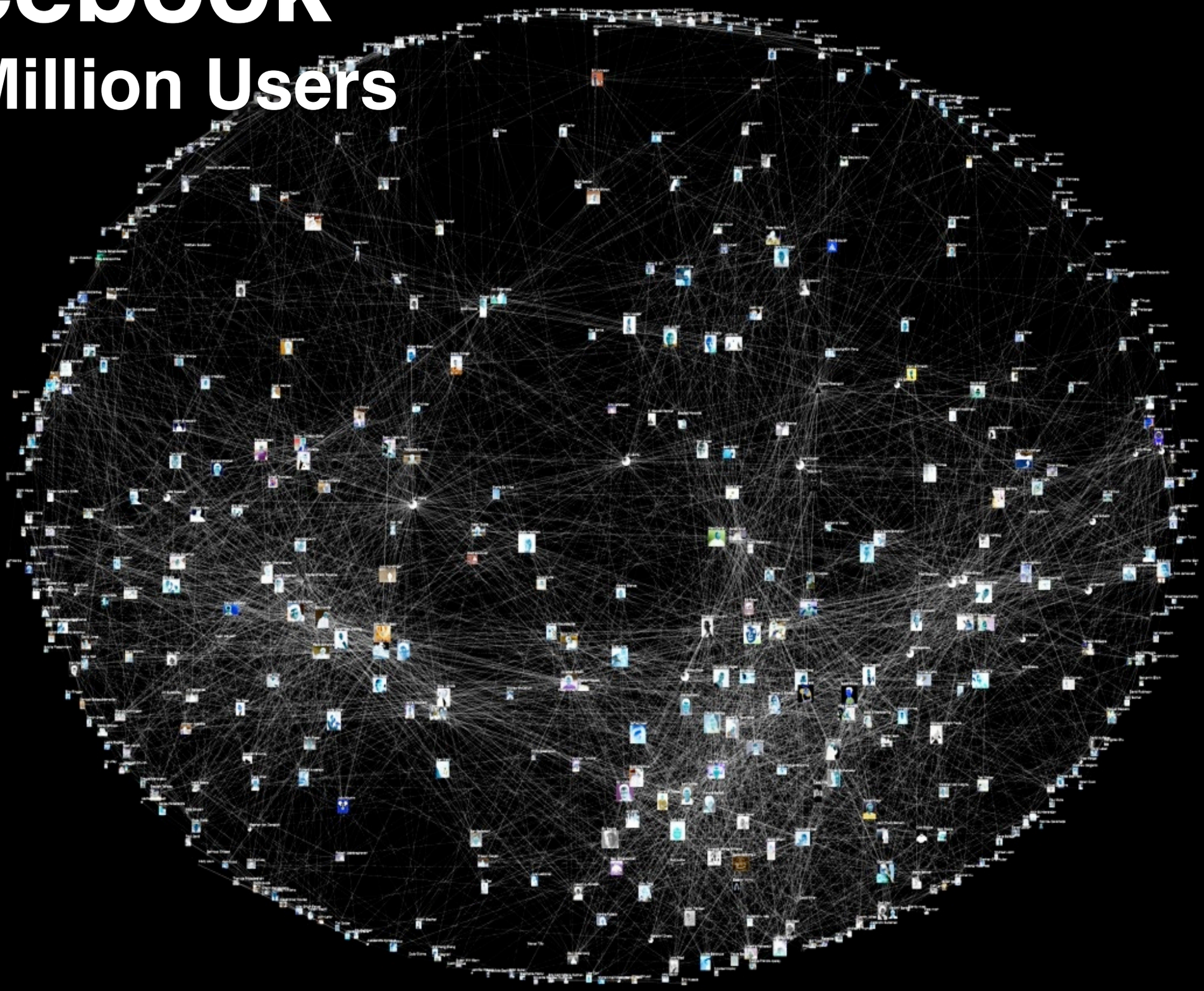
Internet

50 Billion Web Pages



Facebook

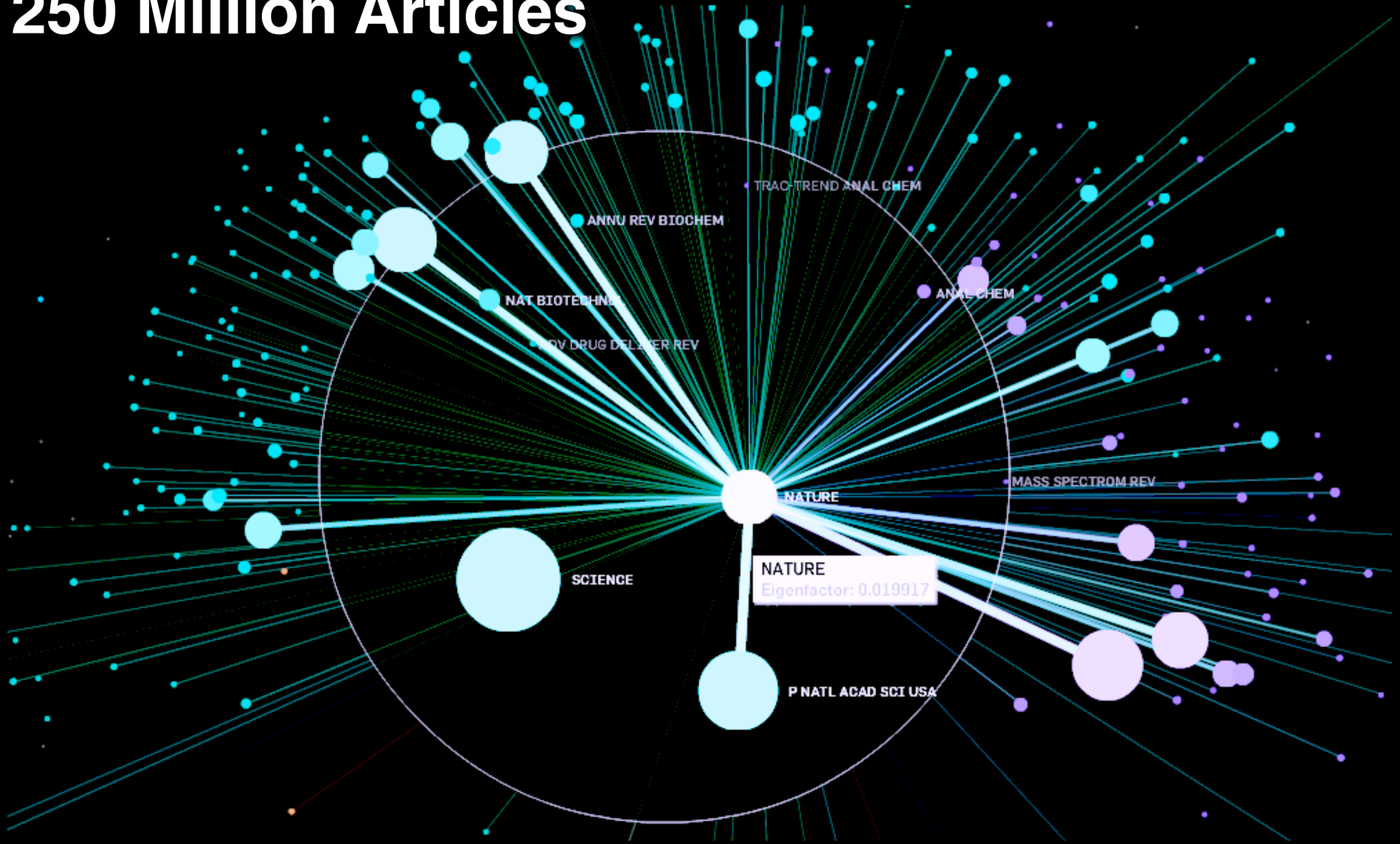
800 Million Users



Modified from Marc_Smith, flickr

Citation Network

250 Million Articles



www.scirus.com/press/html/feb_2006.html#2 Modified from well-formed.eigenfactor.org

Many More

twitter

Who-follows-whom (500 million users)

amazon

Who-buys-what (120 million users)

at&t **cellphone network**

Who-calls-whom (100 million users)

Protein-protein interactions

200 million possible interactions in human genome

Sources: www.selectscience.net www.phonedog.com www.mediabistro.com www.practicalecommerce.com/

Large Graphs I Analyzed

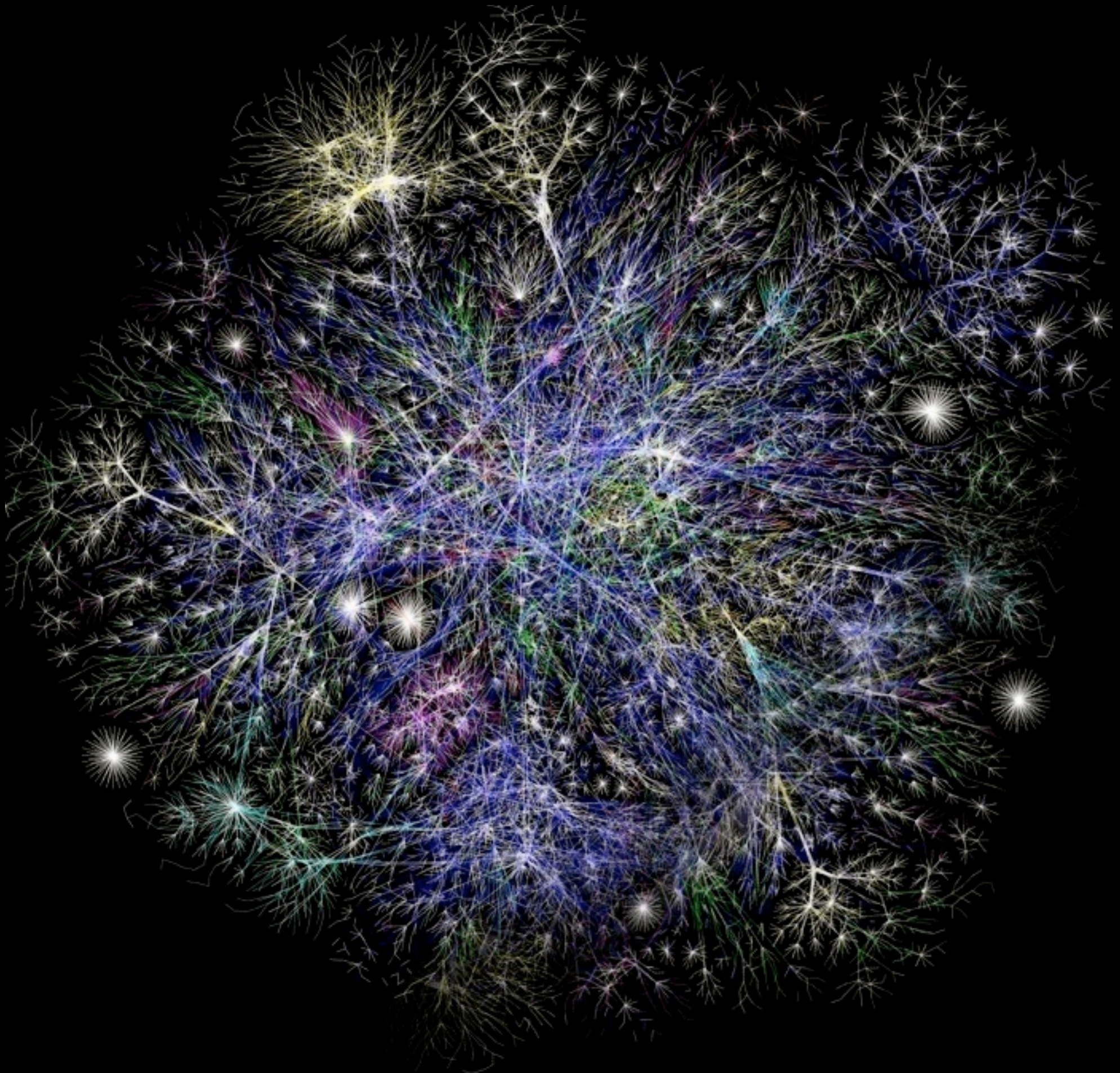
Graph	Nodes	Edges
YahooWeb	1.4 Billion	6 Billion
Symantec Machine-File Graph	1 Billion	**37 Billion**
Twitter	104 Million	3.7 Billion
Phone call network	30 Million	260 Million

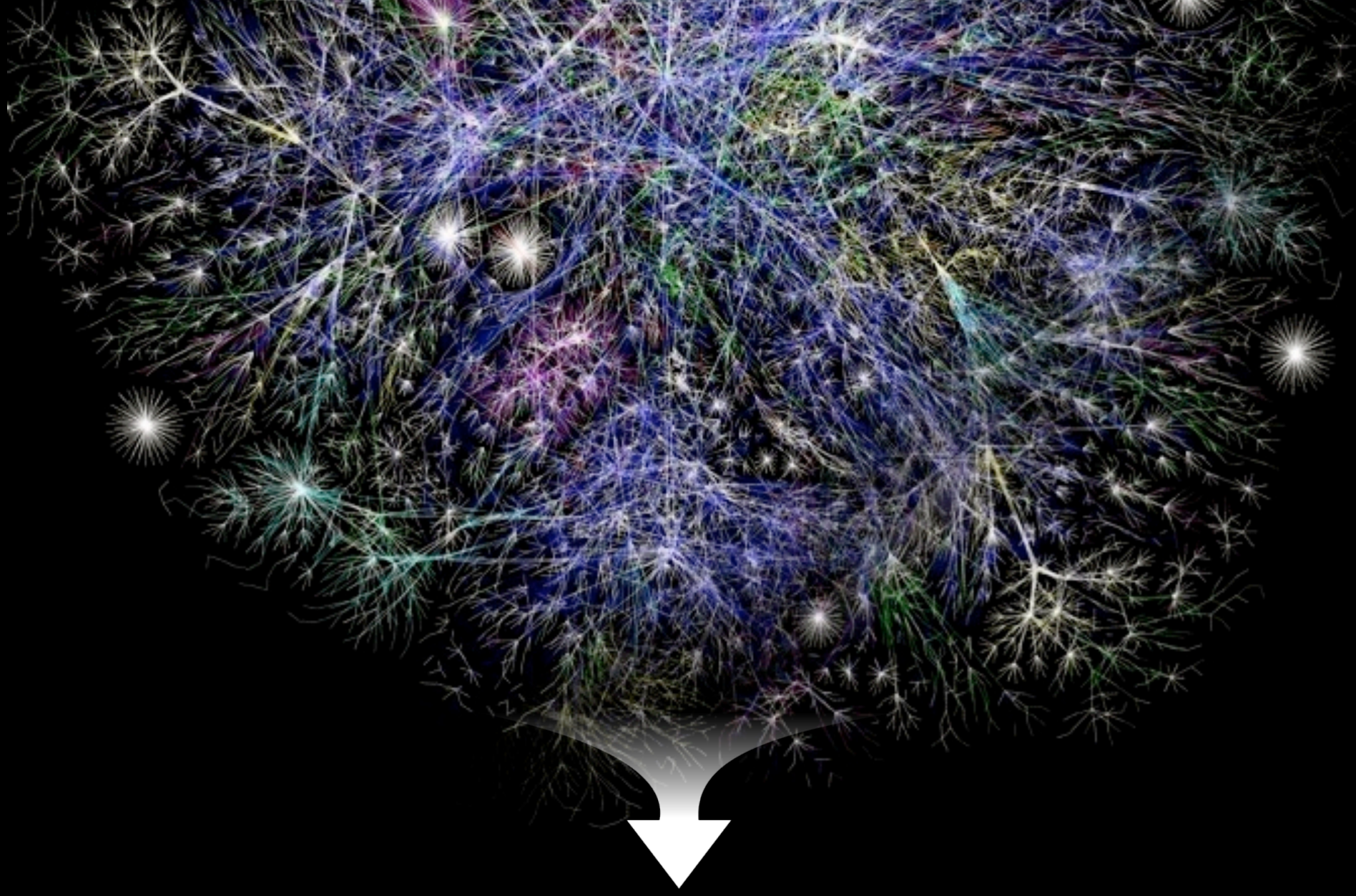
7

7±2

Number of items an average human holds in working memory

George Miller, 1956





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Data

Insights

How to do that?

COMPUTATION + VISUALIZATION

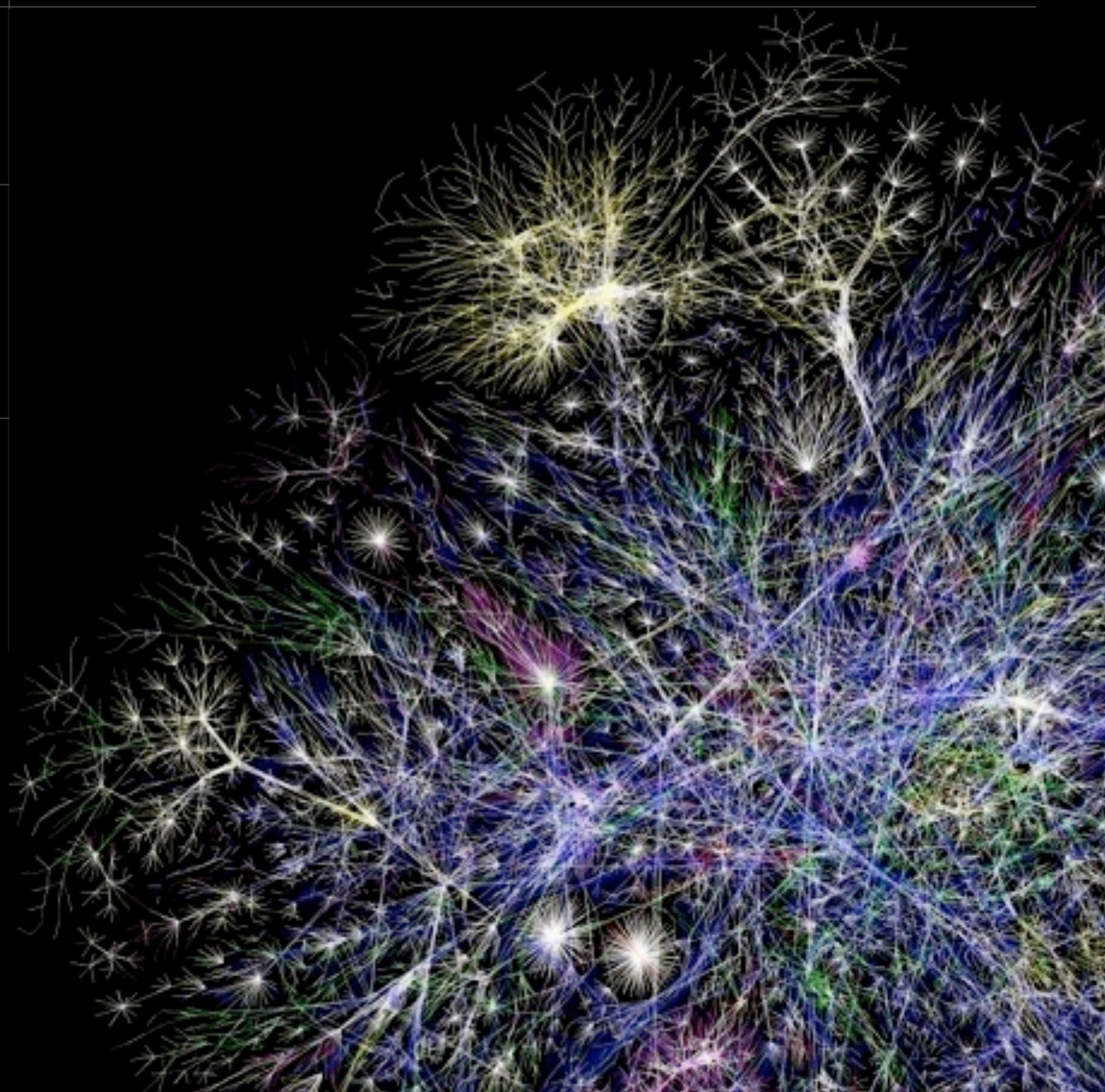
How to do that?

COMPUTATION	VISUALIZATION
Automatic	User-driven; iterative
Summarization, clustering, classification	Interaction, visualization
>Millions of nodes	Thousands of nodes

Both develop methods for making sense of network data

How to do that?

COMPUTATION	VISUALIZATION
Automatic	
Summarization, clustering, classification	
>Millions of nodes	



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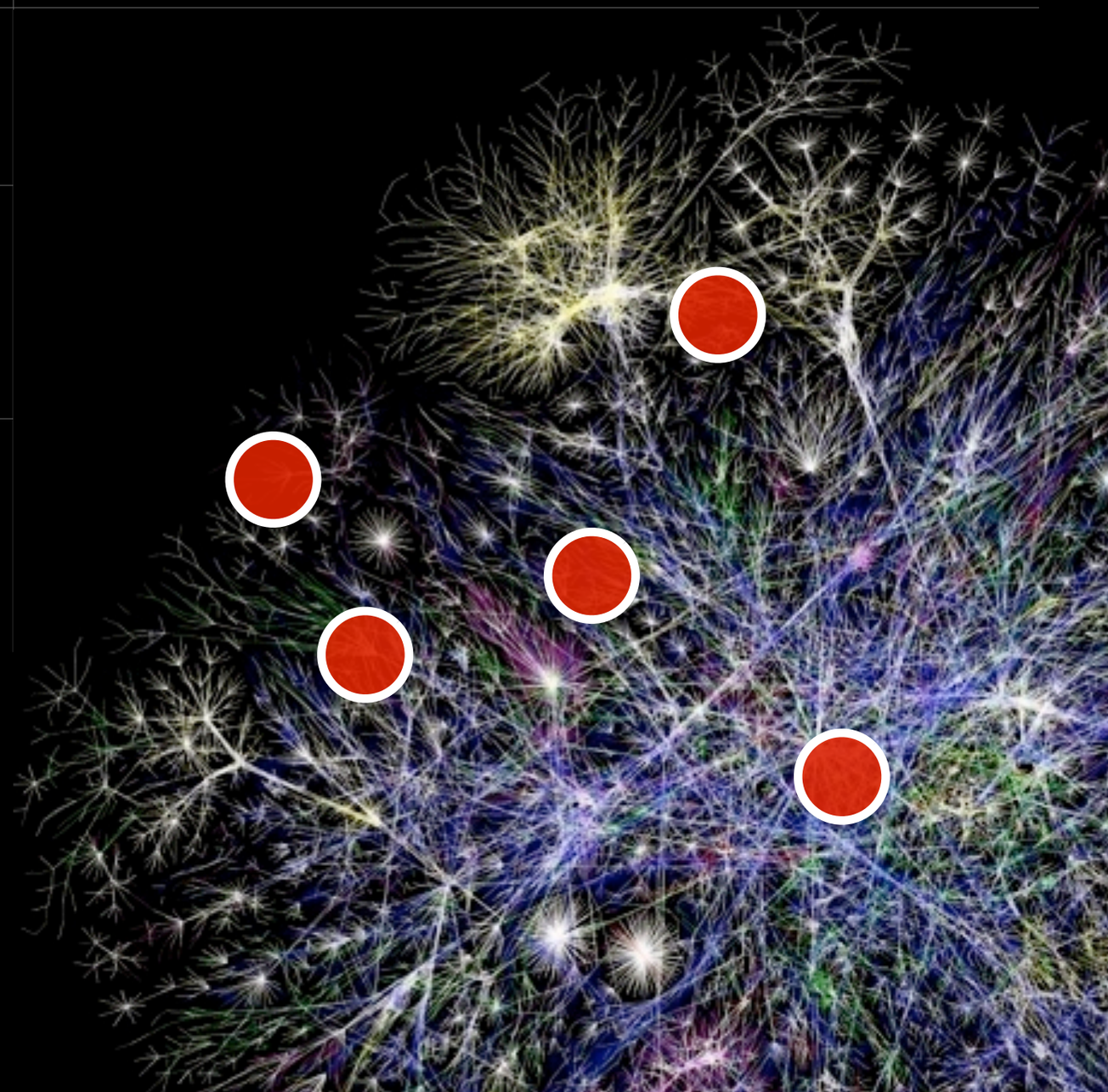

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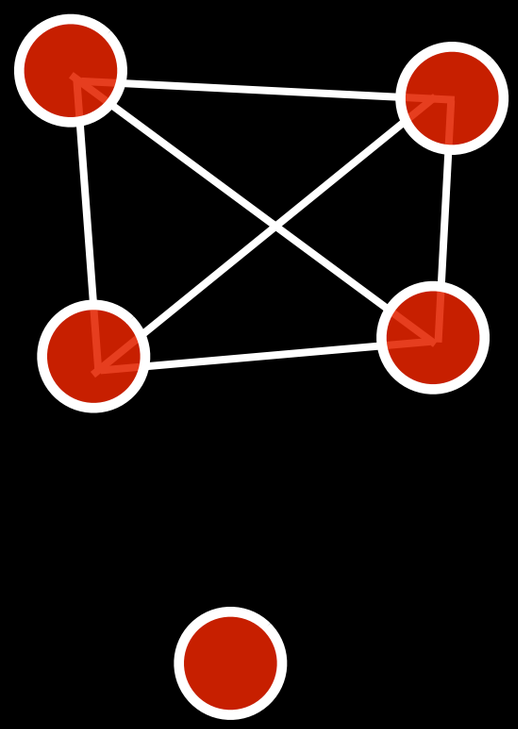	User-driven; iterative
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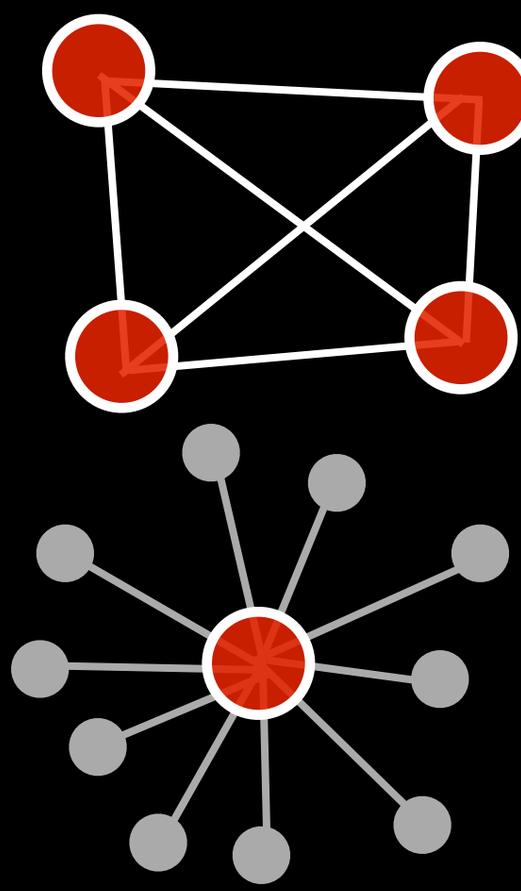
COMPUTATION	VISUALIZATION
	User-driven; iterative
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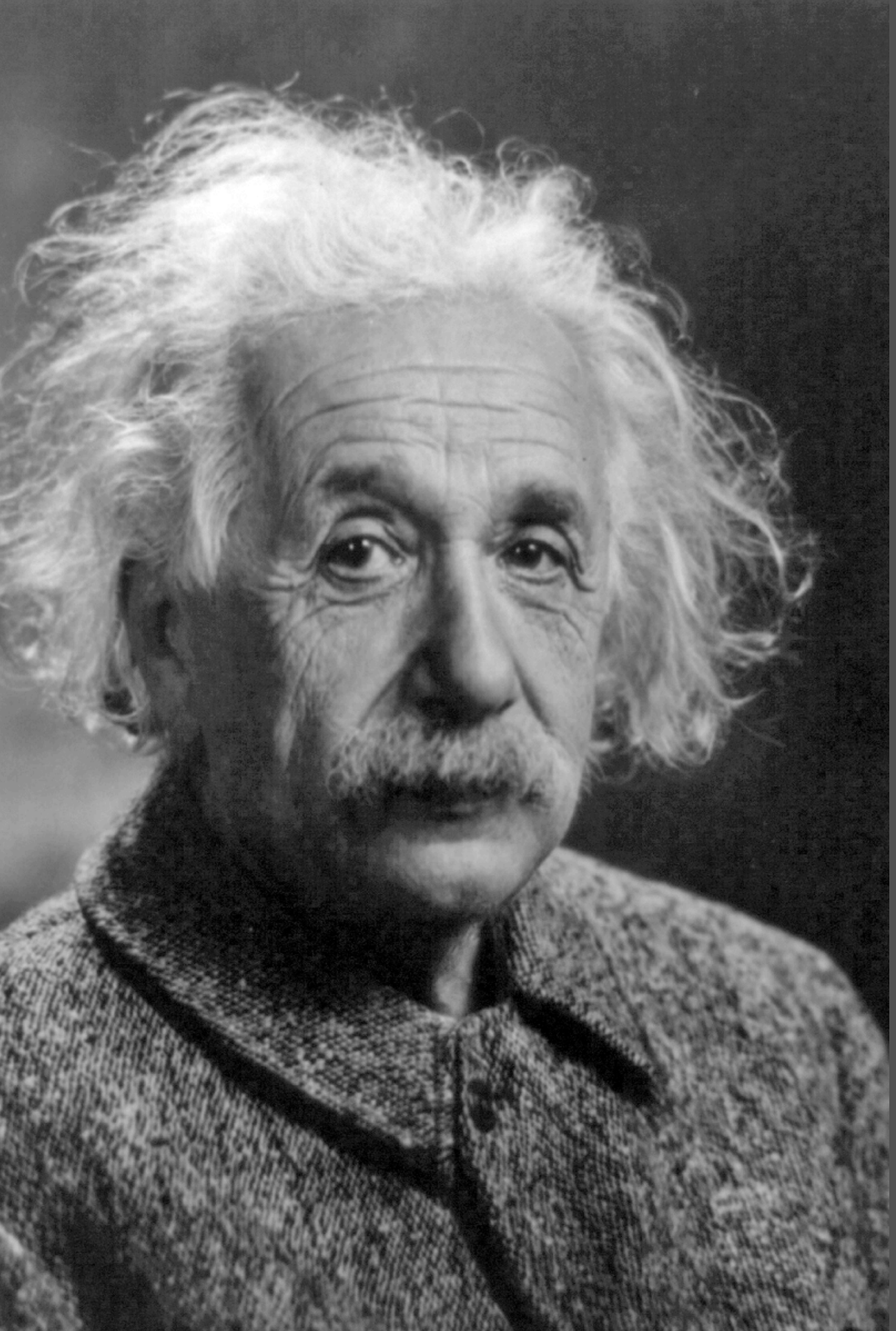


"Computers are incredibly fast, accurate, and stupid.

Human beings are incredibly slow, inaccurate, and brilliant.

Together they are powerful beyond imagination."

Logistics

Course homepage	poloclub.gatech.edu/cse6242/
Discussion, Q&A, find teamates	Piazza (link on homepage)
Submission	T-Square

Course Goals

- Learn a broad class of **scalable** visual and computation techniques and tools, for typical data types
- Learn how to **combine** both kinds of methods (how they complement each other)
- Gain **practical** know-how
- Gain **breath** of knowledge

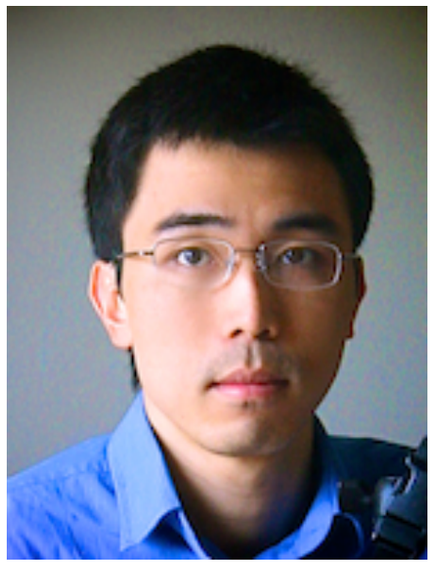
Course Expectation

- Overview of scalable visual and computation techniques and tools
- Gain knowledge & experience (useful for jobs, research)
- Experience with designing and developing an interactive analysis tool

Schedule

See course homepage

Course Staff



Instructor
Duen Horng (Polo) Chau
Assistant Professor, CSE
Thu 3-4pm, Klaus 1324

TA
Parikshit Ram
PhD student, CSE
Mon 4-5pm, Klaus 1315

Grading

- 3 homework assignments (40%)
  - End-to-end analysis
  - Techniques (computation and vis)
  - Hadoop (+ other "big data" tools)
- Group project (50%) -- 2 to 3 people
- Participation (10%) -- in class, on Piazza