



INFORMATION  
TECHNOLOGY  
UNIVERSITY

# RM LECTURE 3 & 4



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Information Technology University

# ALTMETRICS

A new way to study science by leveraging social media engagement on scientific literature.

# alt + metrics

Complementary  
to traditional  
citation metrics

Score is an *indicator* and the underlying, qualitative data tells you who's saying what about research.

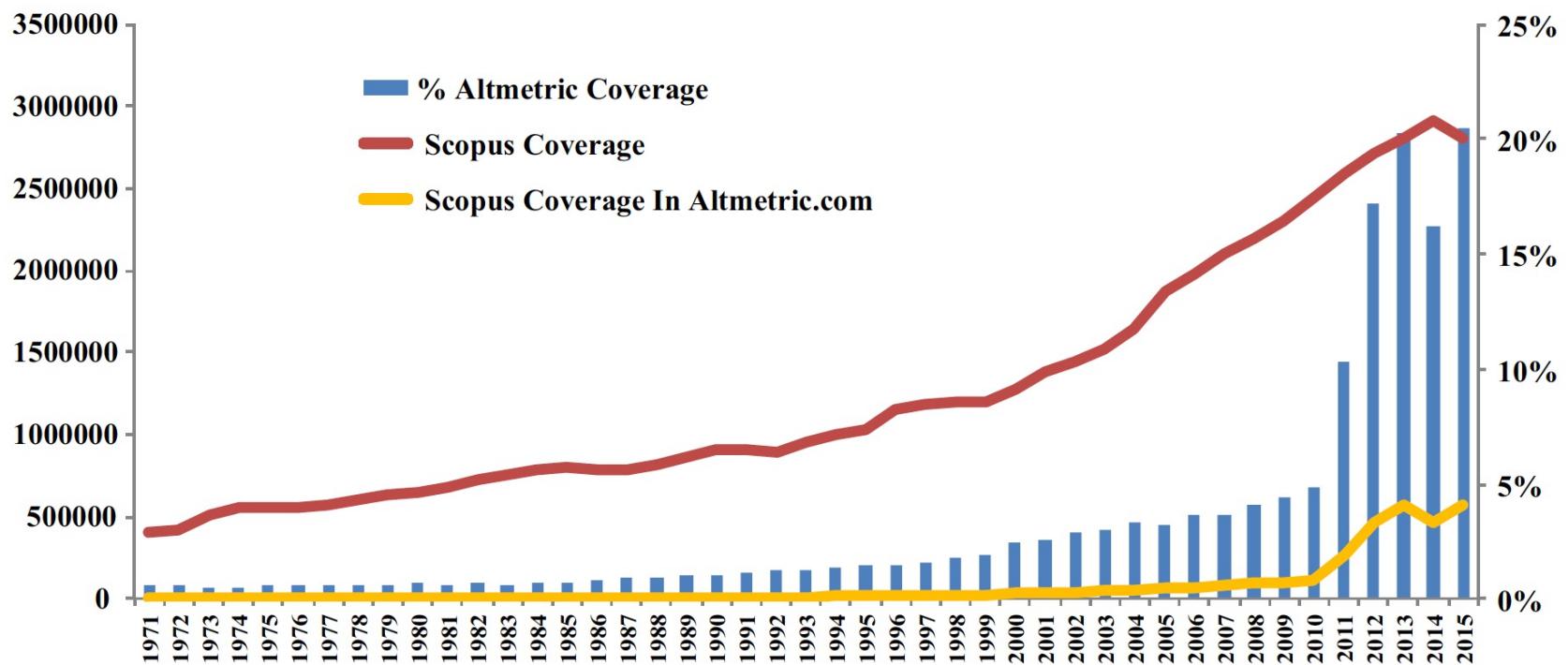


Altmetric

Source: <https://www.altmetric.com>

# ALTMETRIC COVERAGE

Of the total Scopus database, over **20%** is covered by Altmetrtic.com in 2015.



# FIELD-WISE COVERAGE July 2011 – December 2015

**Biochemistry, Genetics and Molecular Biology**

**26.44%**

**Medicine and Medical Sciences**

**23.55%**

**Health Professions and Nursing**

**22.92%**

...

**Engineering**

**2.94%**

**Computer Science**

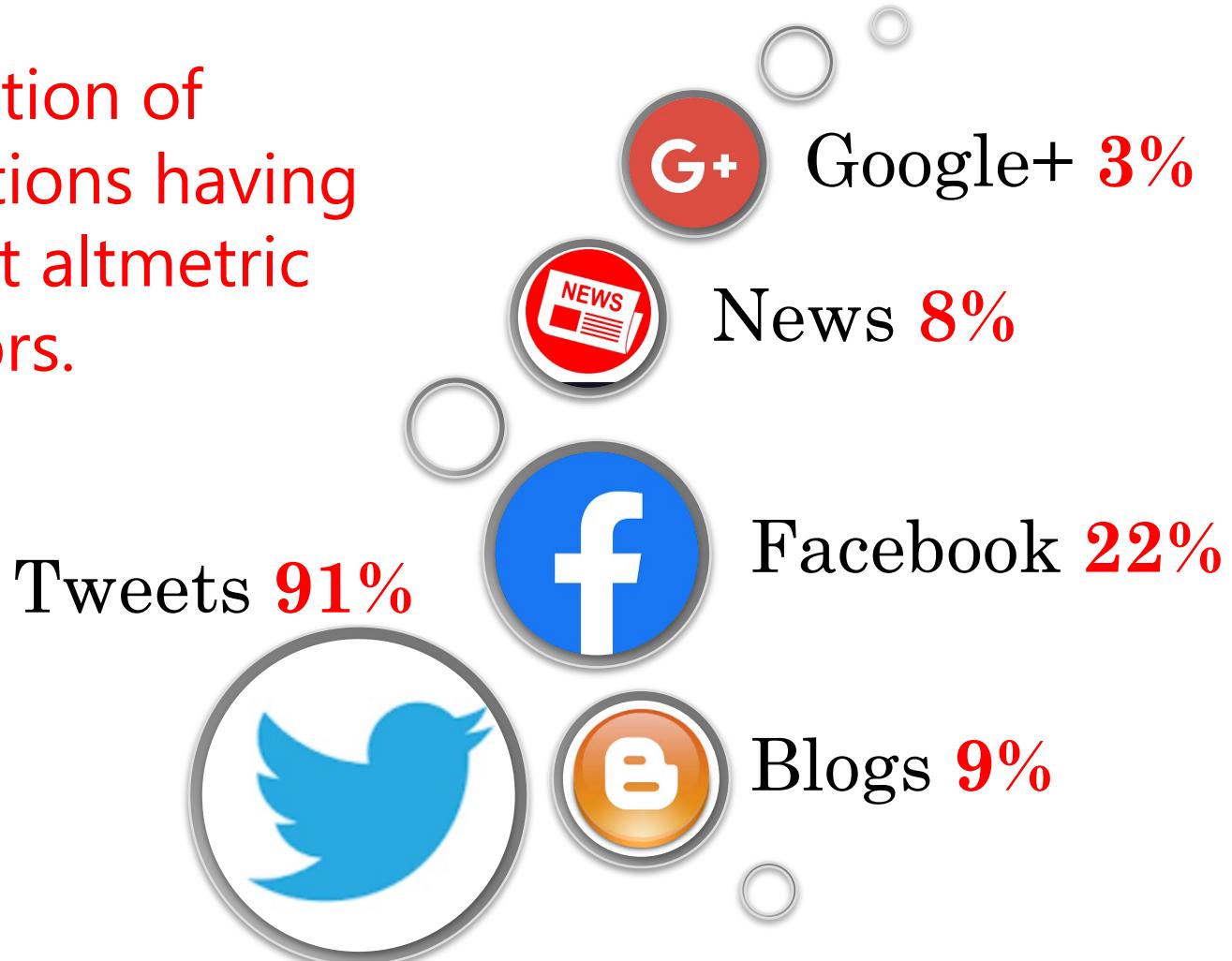
**2.26%**

**Agricultural Sciences**

**1.59%**

# SOCIAL MENTIONS - 1.1 MILLION PAPERS

Distribution of publications having different altmetric indicators.



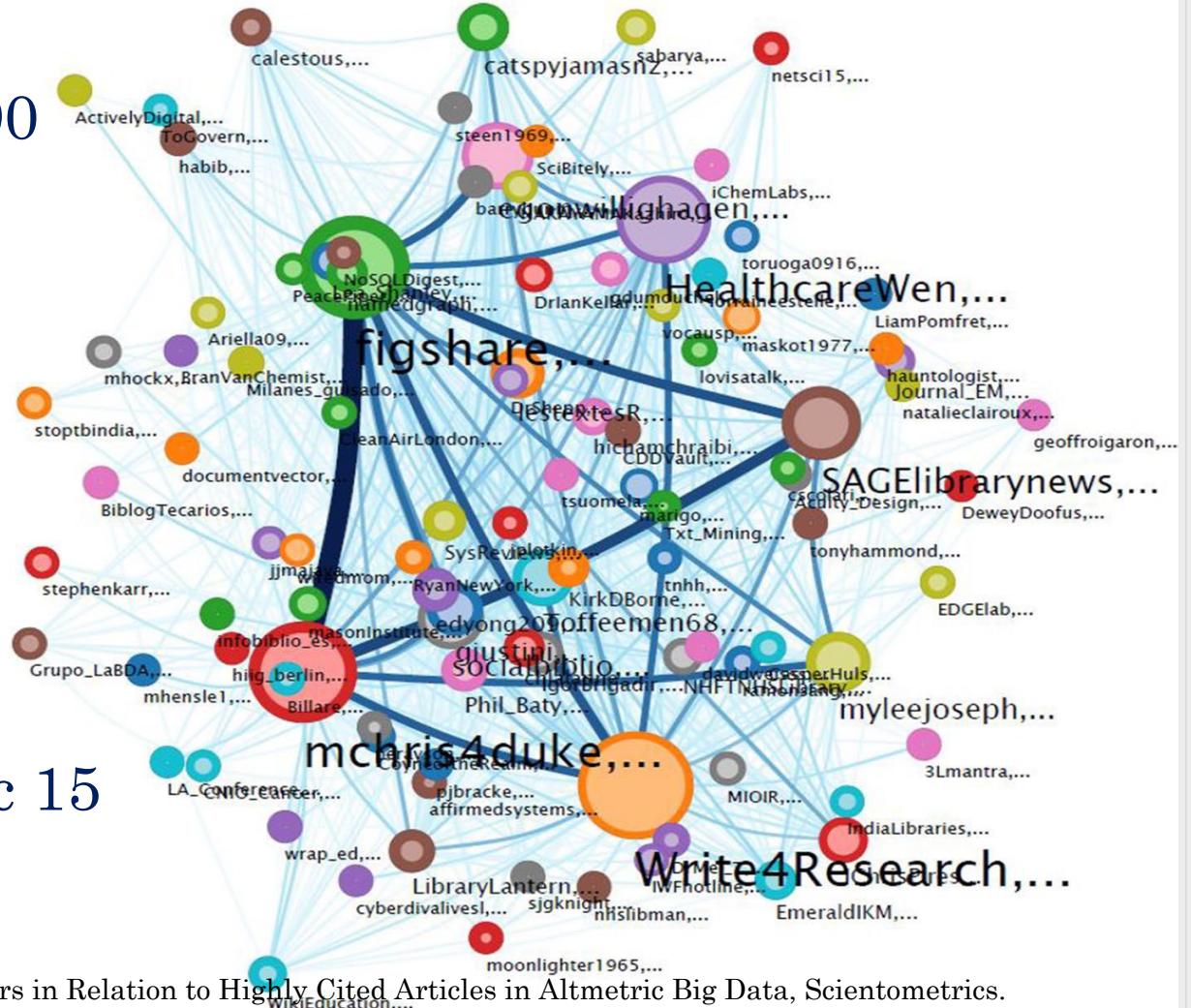
# TWEETER MENTION NETWORK

**Twitter Users:** 5490

**Tweets:** 10,345

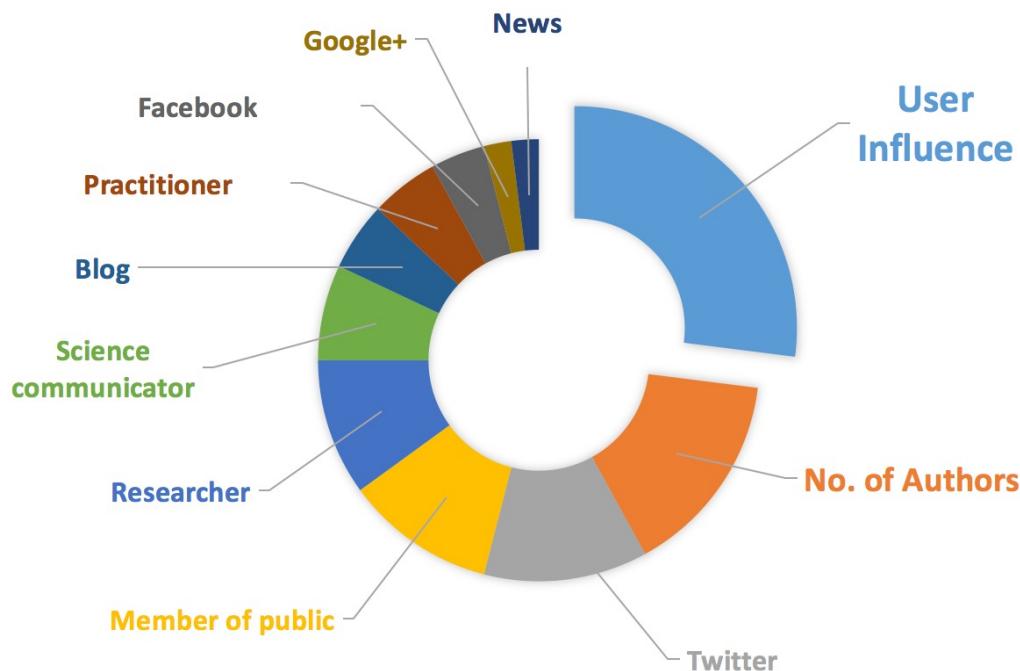
**Area:** LIS

**Time:** July 11, Dec 15



# IMPORTANT FEATURES

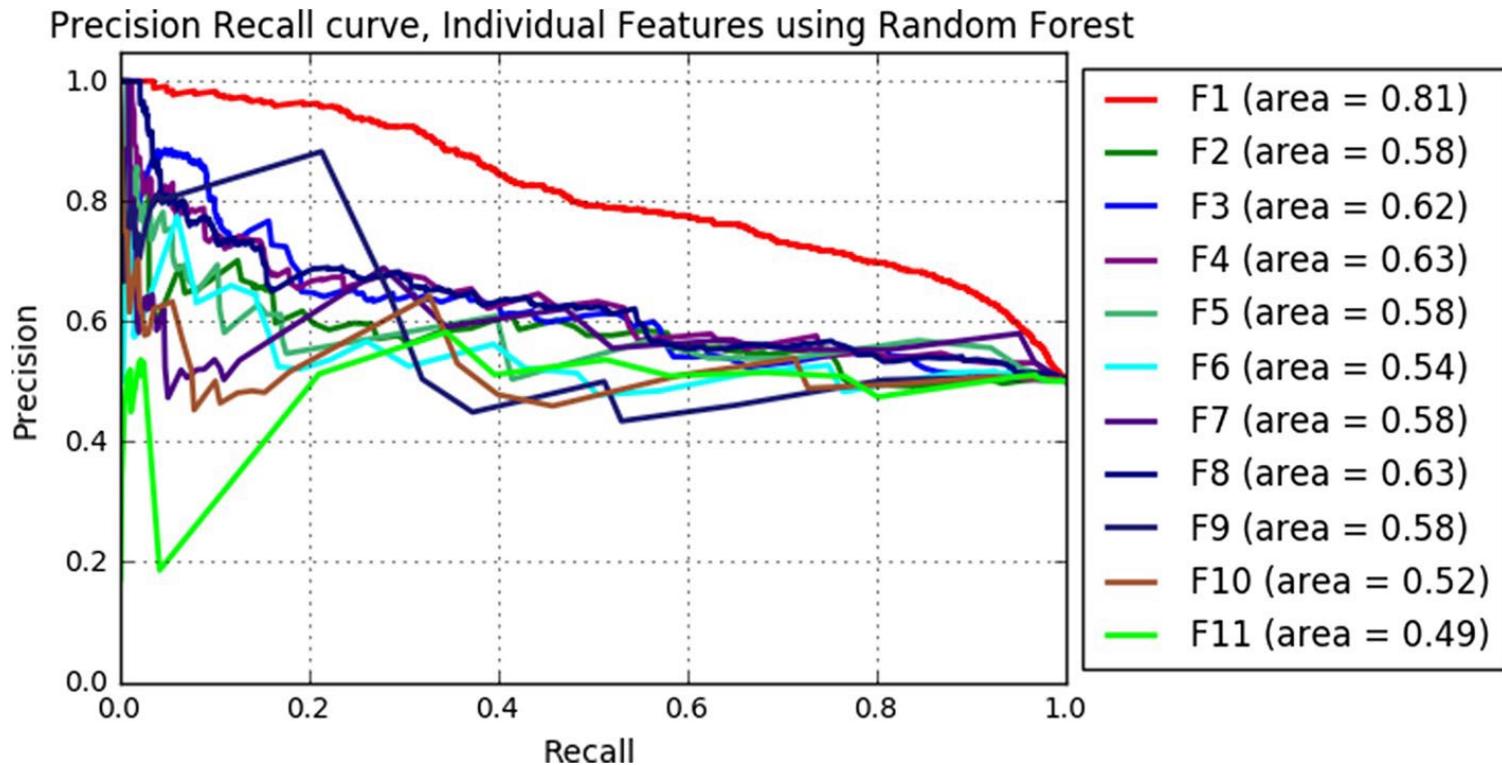
**Extra-Tree Classifier** gives the best score for User Influence **0.27**, followed by Number of authors **0.15**.



Features	Score
User influence	0.27
No. of authors	0.15
Twitter post count	0.12
Member of public	0.11
Researcher	0.10
Science communicator	0.07
Blog post count	0.05
Practitioner	0.05
Facebook post count	0.04
Google+ post count	0.02
News post count	0.02

# PRECISION RECALL CURVE

**User influence** gives the best PR area of 0.81, followed by Number of authors 0.68.



# NETWORK-LEVEL PROPERTIES

Twitter: 1.4 million tweets

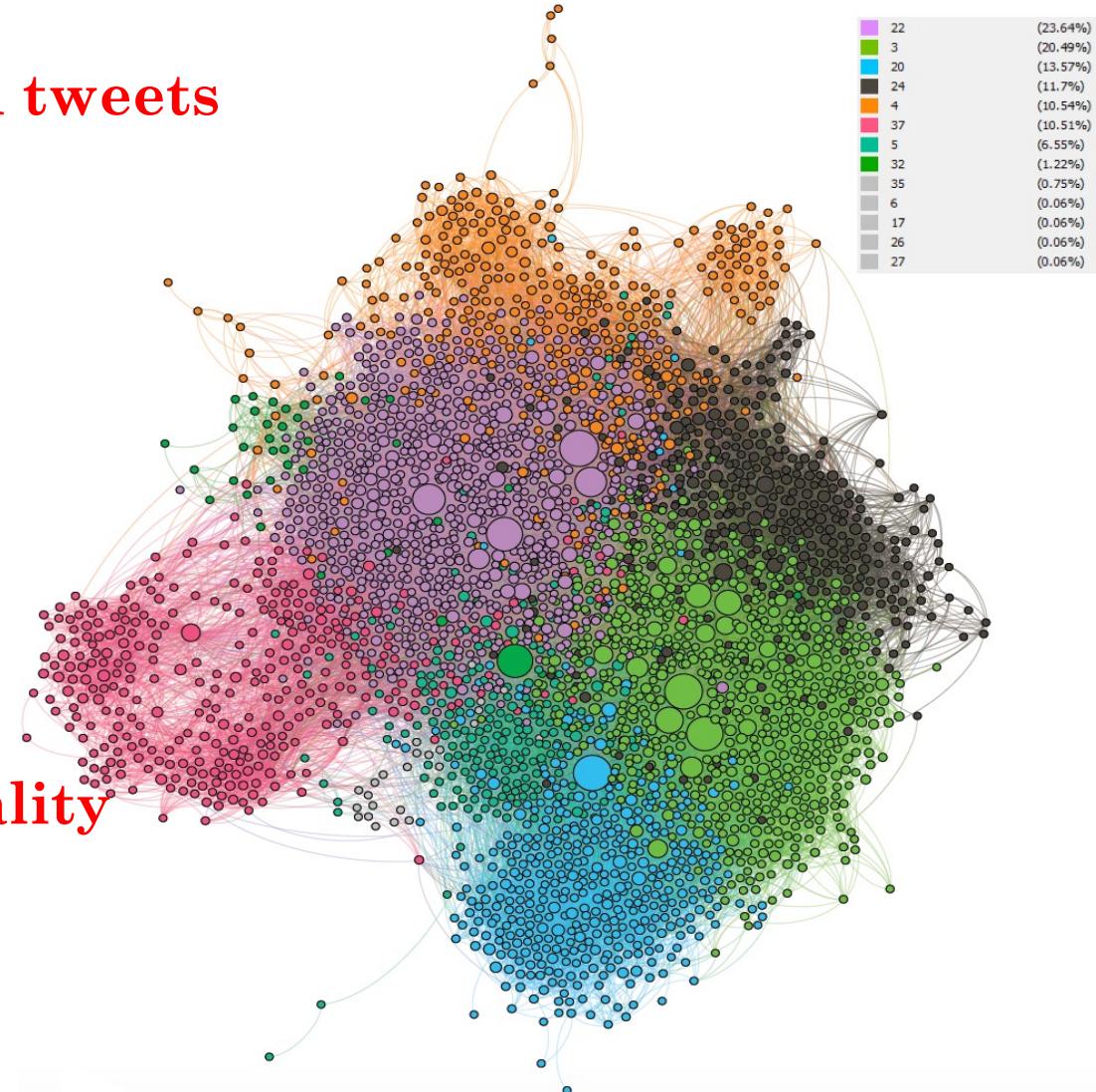
Publications: 75k

Published in 2015

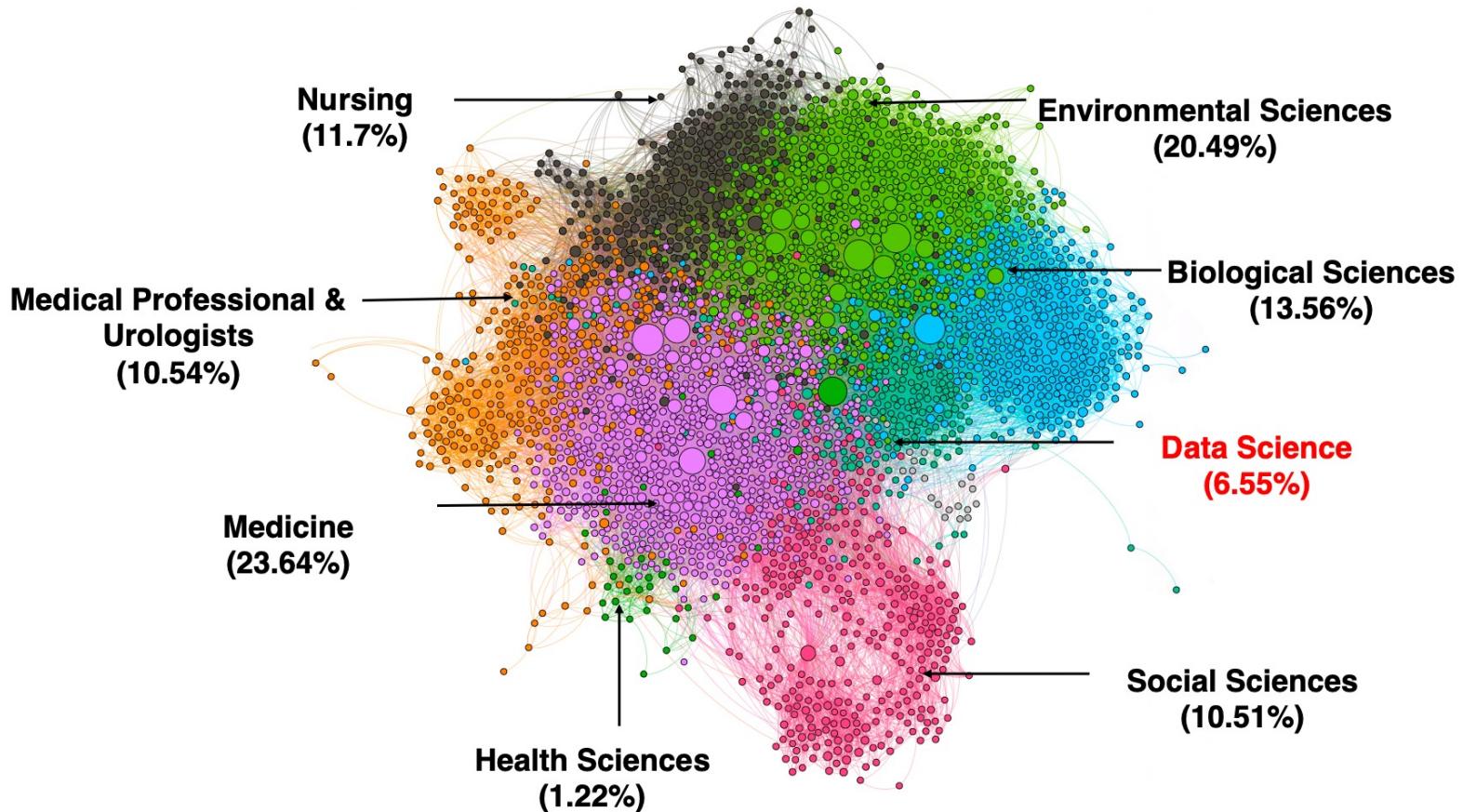
Mention network

Eigenvector centrality

Source: Said et al (2019), Scientometrics

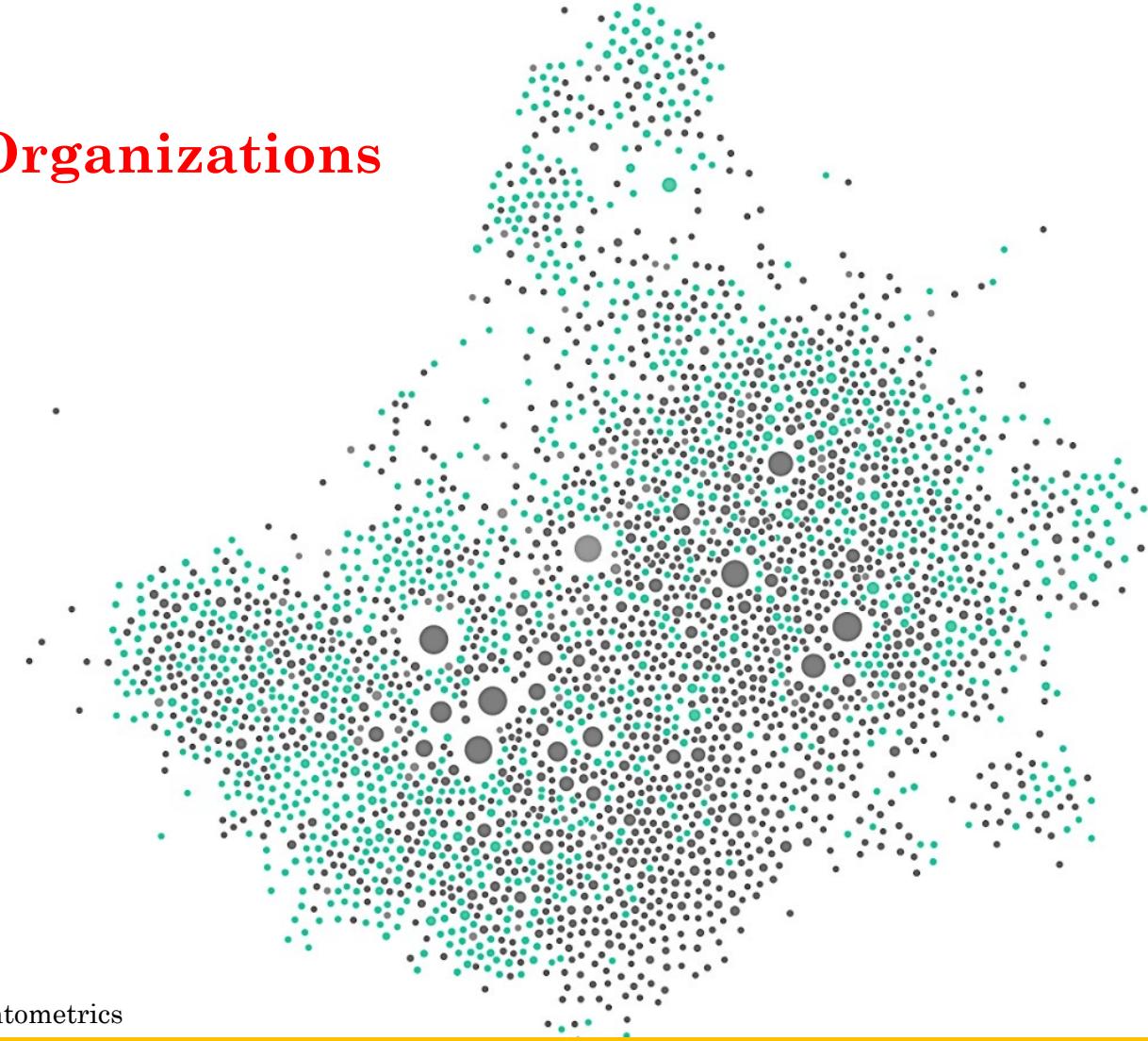


# MAJOR COMMUNITIES ON TWITTER



# WHO ARE THE INFLUENTIAL USERS?

- **Journal / Organizations**
- **Scholars**



# TOP 20 INFLUENTIAL TWITTER USERS



**nature**  
International weekly journal of science

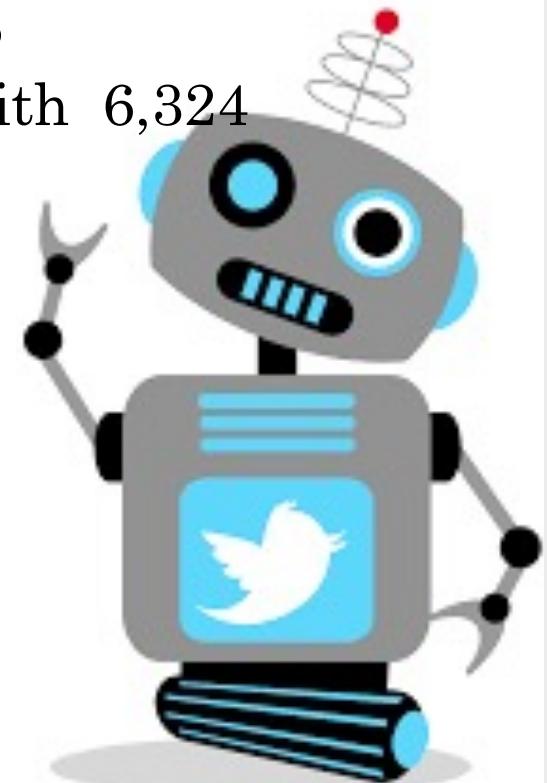


**THE LANCET**

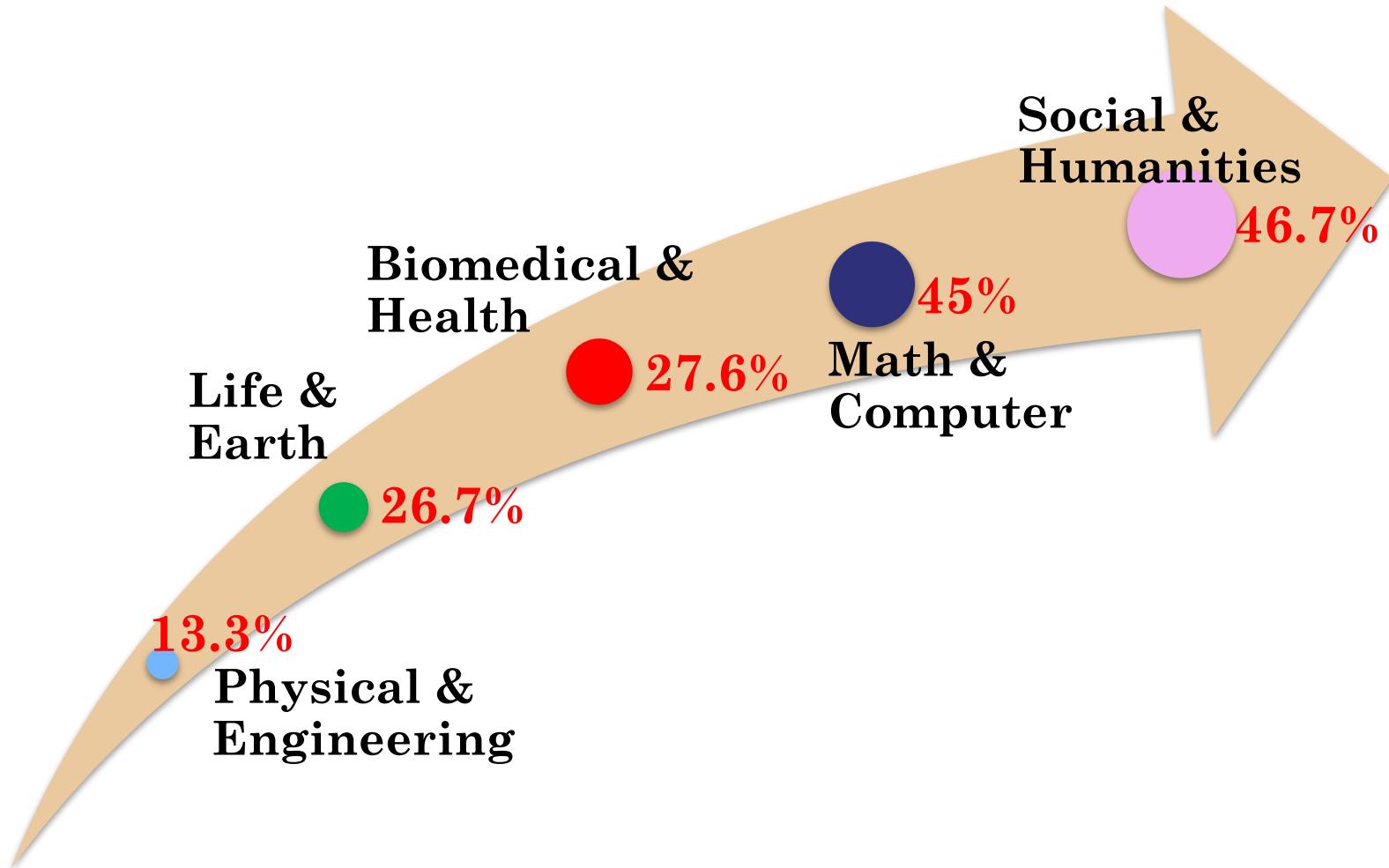
IUs	Type	EV-centrality	Page Rank
PLOSONE	Journal	1	0.0058
Science_Magazine	Journal	0.844	0.0056
JAMA_Current	Journal	0.828	0.0047
Nature	Journal	0.81	0.0054
TheLancet	Journal	0.777	0.0066
BMJ_latest	Journal	0.71	0.0048
PNASNews	Journal	0.61	0.0027
NEJM	Journal	0.596	0.0036
CellCellPress	Journal	0.457	0.0019
NatureNews	Journal	0.42	0.004
Nature	Journal	0.413	0.0036
PLOSBiology	Journal	0.359	0.0014
WHO	Organization	0.312	0.0014
NatureBiotech	Journal	0.304	0.0012
CurrentBiology	Journal	0.298	0.0012
NatureMedicine	Journal	0.293	0.0013
BJSM_BMJ	Journal	0.271	0.0016
PLOS	Journal	0.26	0.0011
NatureGenet	Journal	0.251	0.0007
AnnalsofIM	Journal	0.232	0.0011

# BOTS IN ALTMETRICS

- Bot Prediction on Social Networks of Twitter in Altmetrics using Deep Graph Convolutional Networks  
**Aljohani, Fayoumi & Hassan (2020)**
  - Articles **1,753,151**, #Tweeted DOIs **472,168**
  - Subset of 300 articles across 5 fields with 6,324 tweets
- **Biomedical & Health** - 1,633
- **Social & Humanities** - 1,030
- **Life & Earth** - 1,720
- **Physical & Engineering** - 1,615
- **Math & Computer** - 390

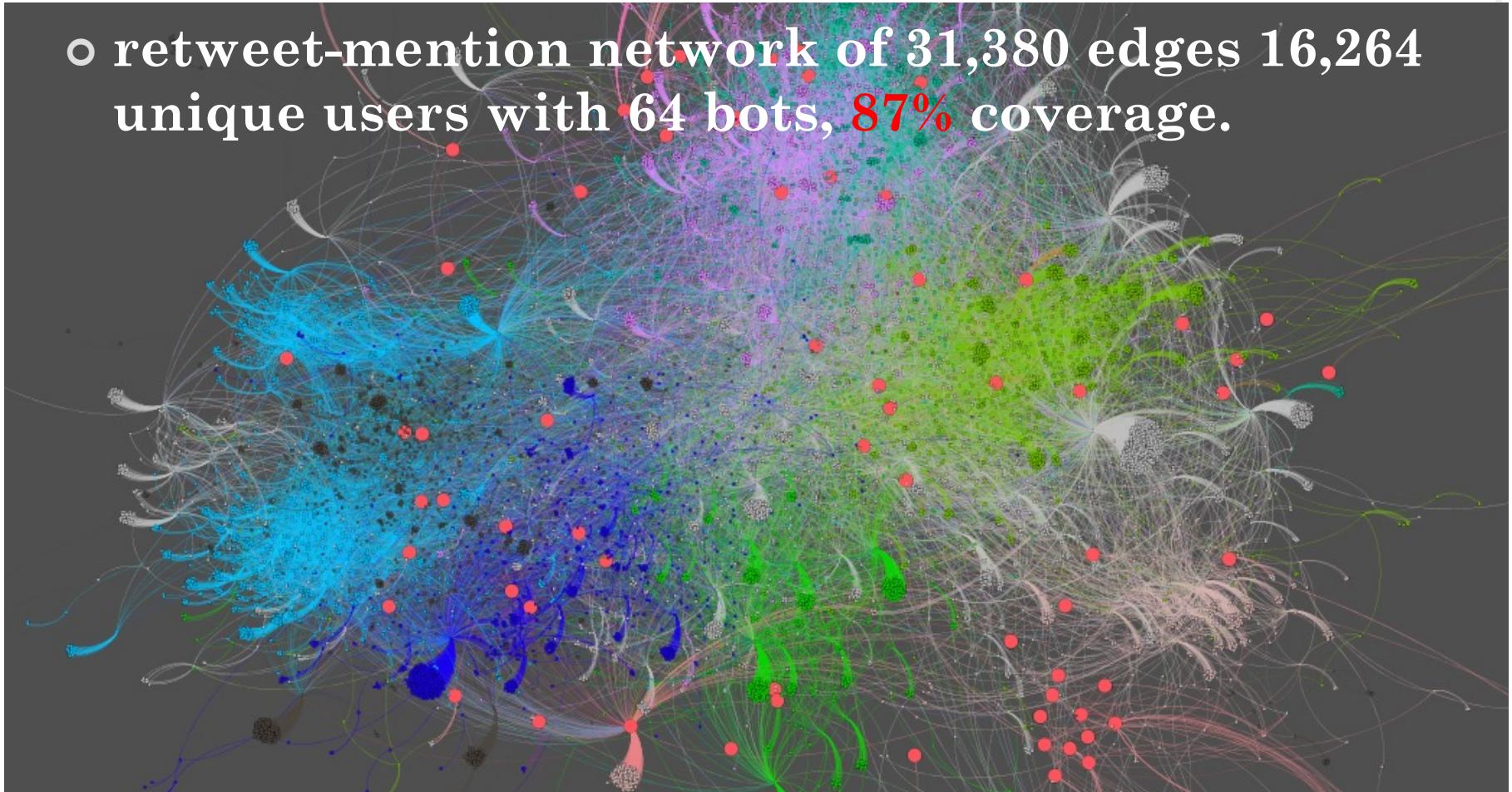


# % FIRST TWEETED BY BOTS



# VISUALIZING BOTS IN ALTMETRICS

- 6,324 tweets mapped with dataset-jun-4-2016.tar.gz during July 2011 and December 2015.
- retweet-mention network of 31,380 edges 16,264 unique users with 64 bots, 87% coverage.



# ALTMETRICS – OPEN CHALLENGES

## Smart Data Processing

- Transforming altmetrics big data into meaningful smart data.
- Small data for decision making.

## Fake Social Interaction

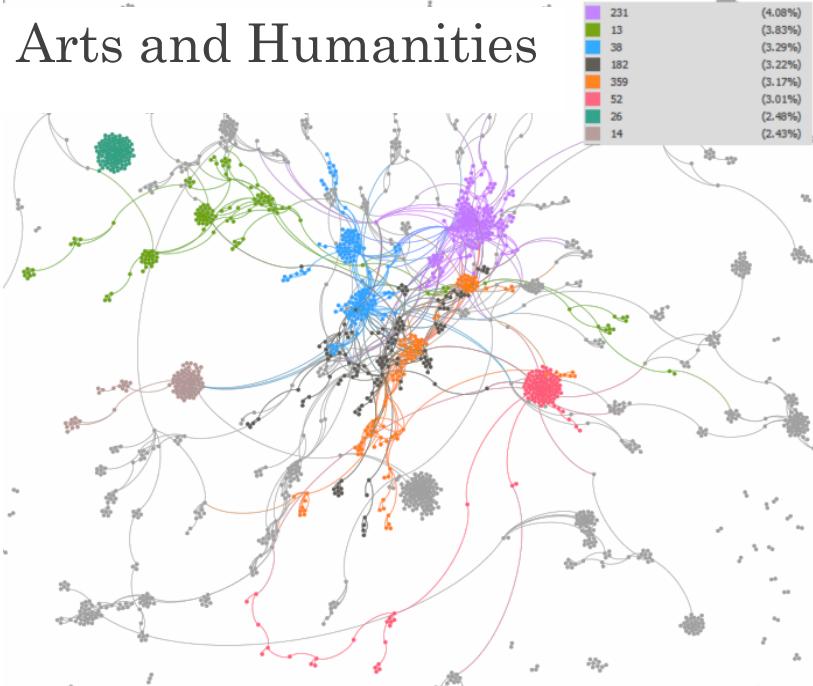
- Methods to detect fake science news dissemination.

## Data Normalization

- Differences in inter and intra connectivity of Twitter user groups may lead to different social usage.

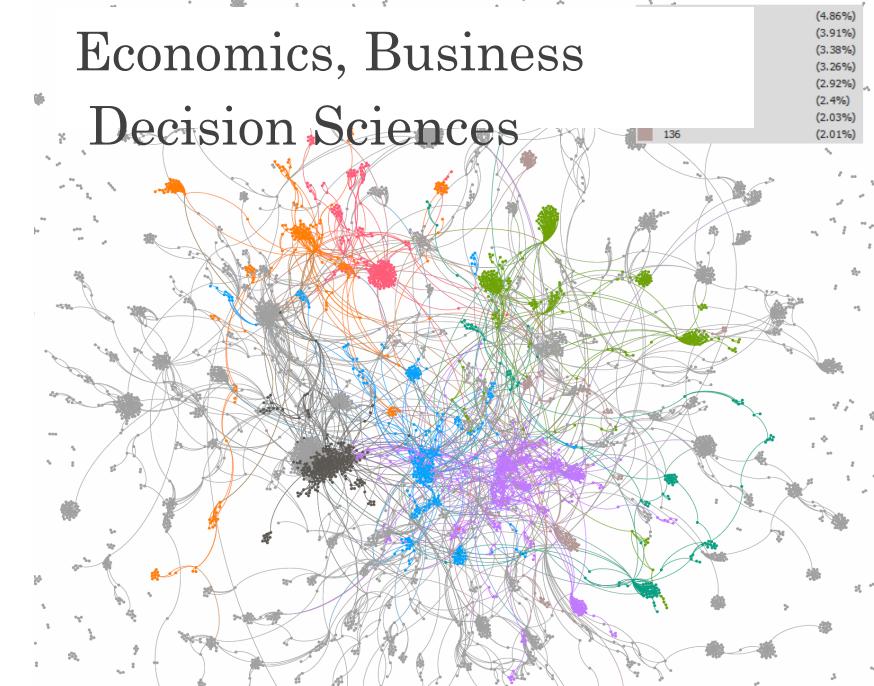
# LOW INTERCONNECTED COMMUNITIES

Arts and Humanities



**Modularity 0.948**

Economics, Business  
Decision Sciences

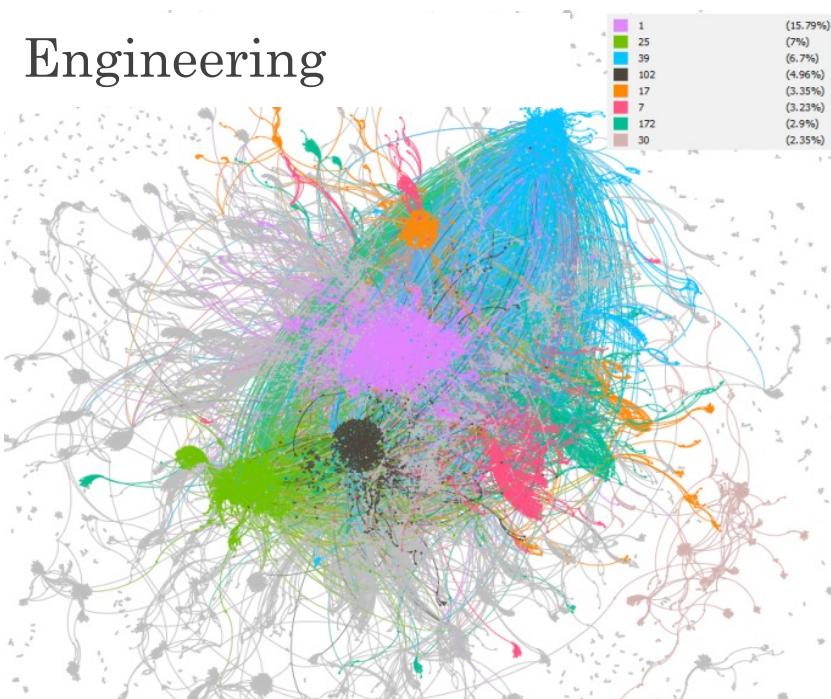


**Modularity 0.938**

- Disciplines with **High Modularity**
- Publications from 2015 in altmetrics jun-4-2016.tar.gz version.

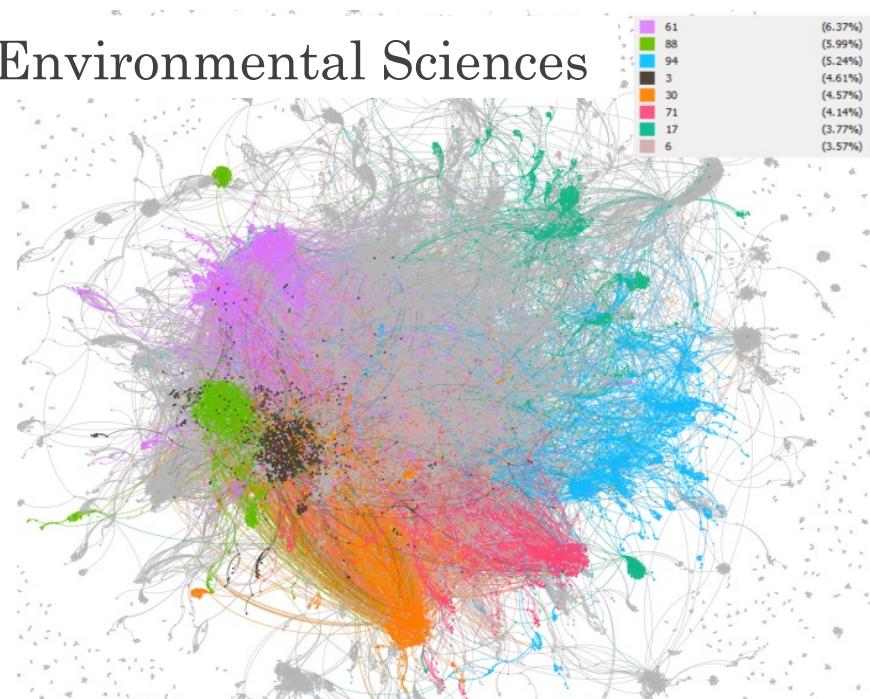
# HIGH INTERCONNECTED COMMUNITIES

Engineering



**Modularity 0.787**

Environmental Sciences



**Modularity 0.773**

- Disciplines with relatively **low Modularity**
- Publications from 2015 in altmetrics jun-4-2016.tar.gz version

# ALTMETRICS – OPEN CHALLENGES

## Bots

- Bot social media accounts.
- Discrimination of Organic accounts.

## Data Driven

Altmetrics is data driven.  
Measurement Theory vs.  
'Data-Driven'.

## Leaping Forward

- **Clear KPIs** and Goals.
- Improved NLP methods for the qualitative assessment.