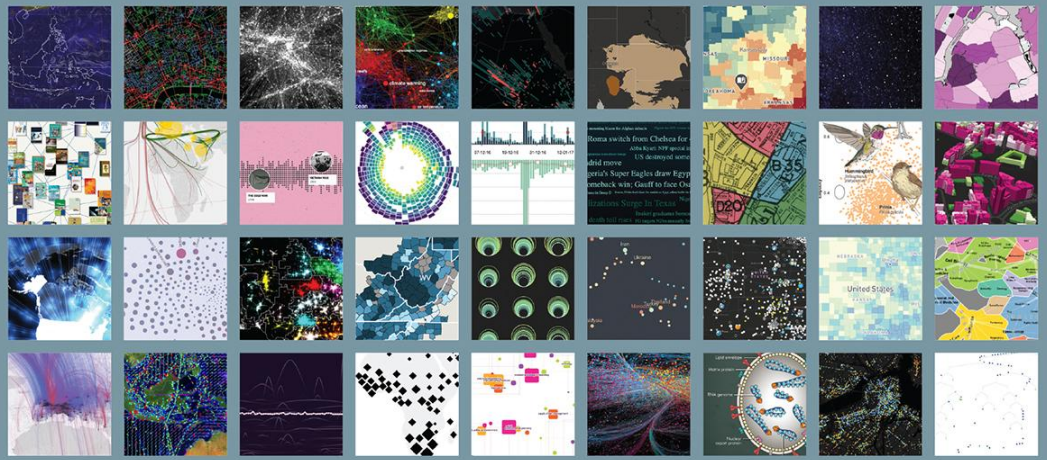
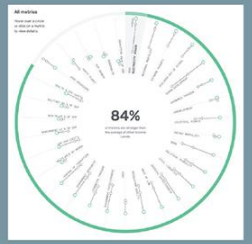
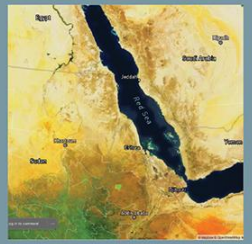
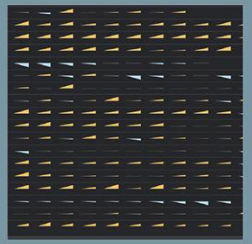
Program will begin at 10 am ET



Macroscope Tools for Global Challenges







Website

Zoom

MACROSCOPE TOOLS FOR GLOBAL CHALLENGES

YEARS OF PLACES & SPACES: MAPPING SCIENCE

Friday, September 20, 2024, 10 am-12 pm ET
Indiana University McCalla Hall

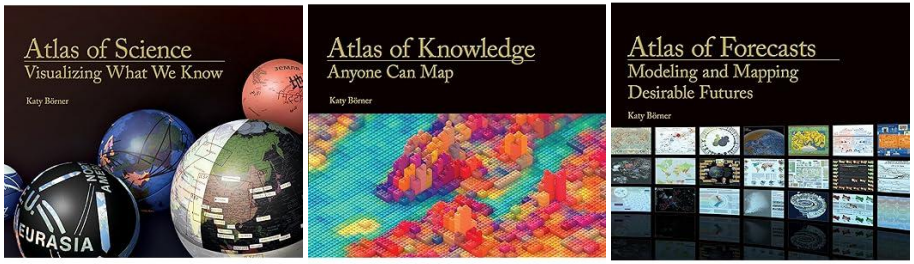
Free, all are welcome to attend in person or online!

Agenda

Friday Sept 20, 2024, all times are ET

10:00 am	Welcome & Introduction by Katy Börner, Lisel Record & Todd Theriault
10:10 am	Past, Present, and Future Maps and Models of Science & Technology by Katy Börner
10:20 am	Global mapping of polarization and ideological alignment on Twitter and its effect on elections by David Chavalarias, Paris, France
10:30 am	*Exploring Archives Through Entities and their Relations* by Nicolas Gutehrlé and Iana Atanassova, Université de Franche-Comté, France
10:40 am	*Mapping the Development and Structure of Science by Yunwei Chen, Chinese Academy of Science, China*
10:50 am	*Science Maps for Kids: The Fundamental Interconnectedness of All Things* by Sarah Huggett, Elsevier, UK
10:55 am	Observations by Andrea Scharnhorst, DANS & KNAW, The Netherlands
11:00 am	Curated Exhibit Tours, Open Discussion & Light Refreshments
12:00 pm	Adjourn

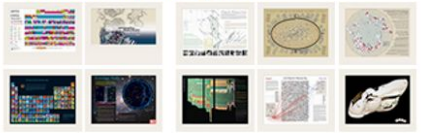
1st Decade of *Places & Spaces*: 100 Maps
(2005-2014)



https://scimaps.org/maps

Iteration I (2005)
The Power of Maps

Iteration II (2006)
The Power of Reference Systems



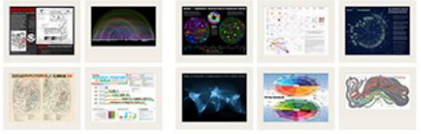
Iteration III (2007)
The Power of Forecasts

Iteration IV (2008)
Science Maps for Economic Decision Makers

Iteration V (2009)
Science Maps for Science Policy Makers

Iteration VI (2010)
Science Maps for Scholars

Iteration VII (2011)
Science Maps as Visual Interfaces to Digital Libraries



Iteration VIII (2012)
Science Maps for Kids

Iteration IX (2013)
Science Maps Showing Trends and Dynamics

Iteration X (2014)
The Future of Science Mapping

"New Trends in eHumanities Research" workshop at the Royal Netherlands Academy of Arts and Sciences, Amsterdam, Netherlands

Ken Kennedy Institute for Information Technology, Rice University, Houston, TX

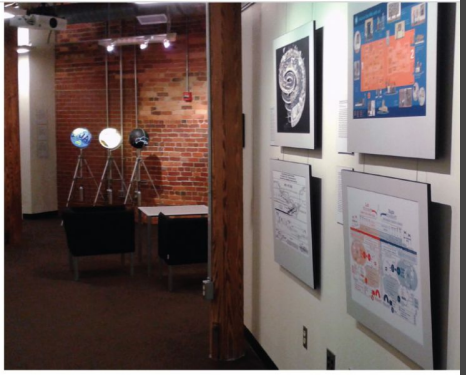


Exhibit maps and Ingo Günther's WorldProcessor globes on display at Duke University, Durham, NC

Katy Börner debuts the exhibit at the University of Miami, Coral Gables, FL

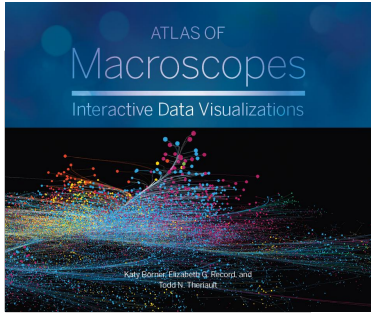
100 science maps on display at the University of Miami, Coral Gables, FL

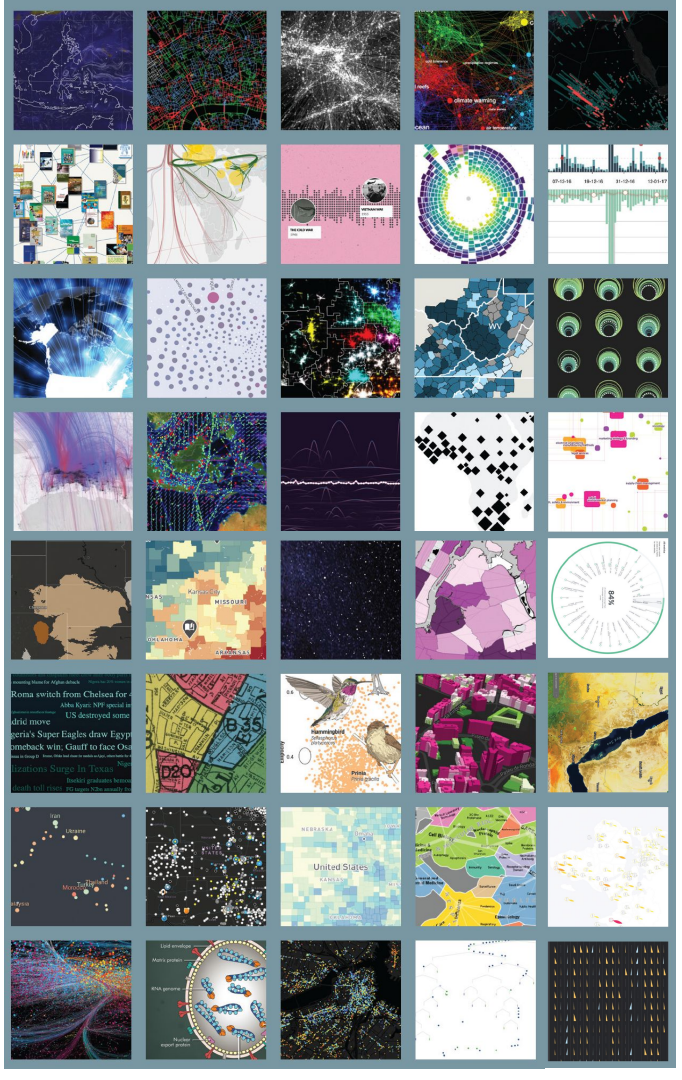
Maps on display at the European Commission, Directorate-General for Research and Innovation, Brussels, Belgium

Jax and the Big Data Beanstalk theater piece introduces visitors to data visualizations and science maps at the Science Museum of Minnesota, St. Paul, MN

Katy Börner presents "Maps & Macroscopes" at TEDxBloomington, Bloomington, IN

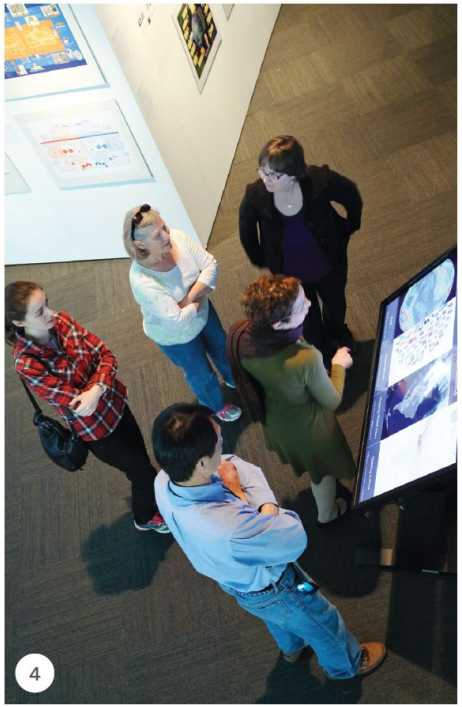
2nd Decade of *Places & Spaces*: 40 Macroscopes
(2015-2024)

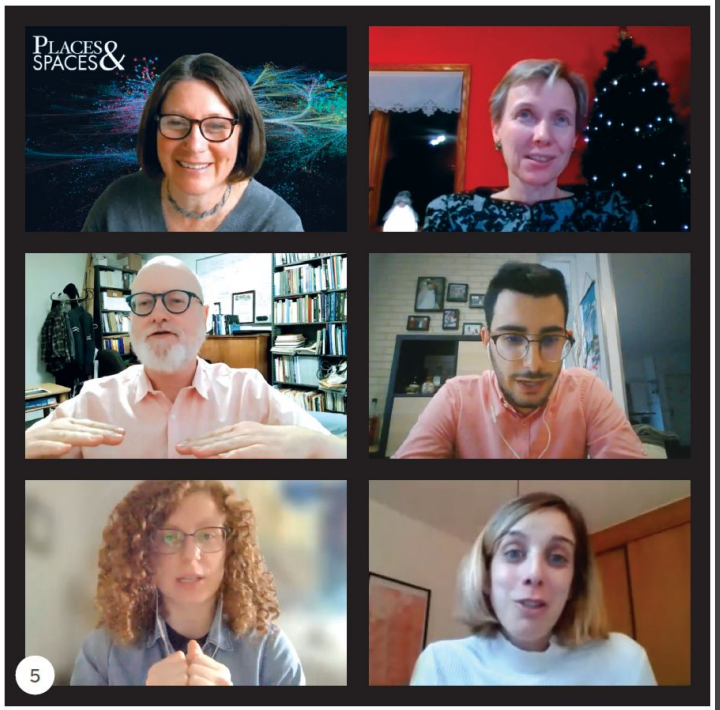




https://scimaps.org/macroscopes

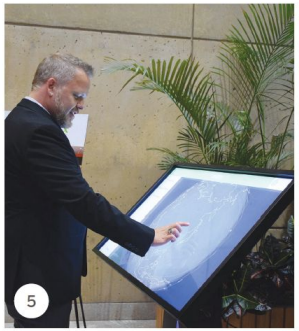
① Understanding the world through data at the Mundaneum's Mapping Knowledge exhibit in June, 2015; ② Kalev Leetaru, creator of the *Mapping Global News* macroscope, prepares for his interview, 2016; ③ *Nature 150* designer Alice Grishchenko discusses bringing the worlds of art and science together, 2021; ④ Visitors engaging with the Macroscope Kiosk at the David J. Sencer CDC Museum, 2015.





Today, 40 macroscopes can be explored via a touchscreen kiosk that provides visual and technical coherence—serving as an exciting entry point for exploring the world of science interactively.

4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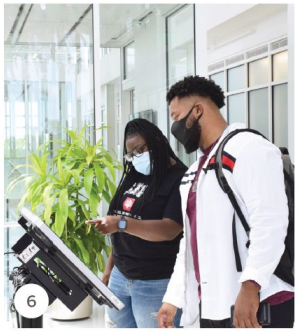
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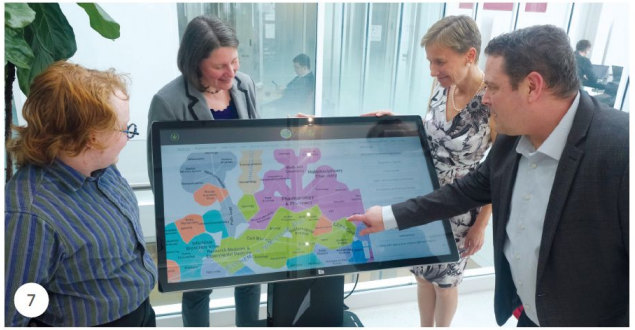
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④ The debut of the *Places & Spaces* 18th iteration, "Macroscopes for a New Perspective," at the University of Michigan's Clark Library, 2022; ⑤ Exploring the *Earth* macroscope at the IU Art Museum, 2016; ⑥ Students enjoying the macroscopes in Luddy Hall, Indiana University, 2020; ⑦ The exhibit team viewing André Skupin's *Coronavirus SoS*, 2023; ⑧ Science Fest 2019, Indiana University; ⑨ First Thursdays at Indiana University, 2019.


8


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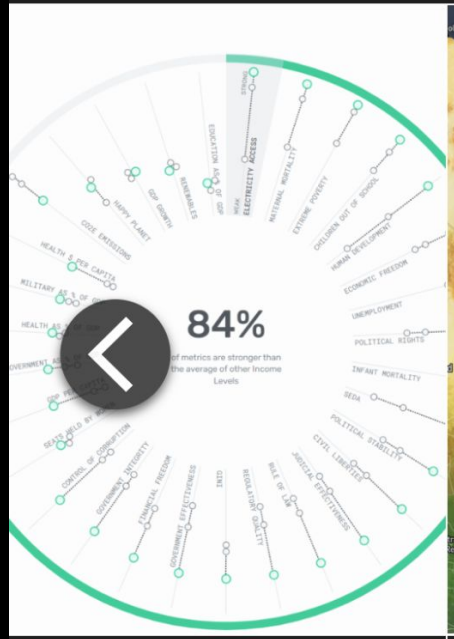
PLACES & SPACES
MAPPING SCIENCE

MACROSCOPES

making sense of the world through data visualization

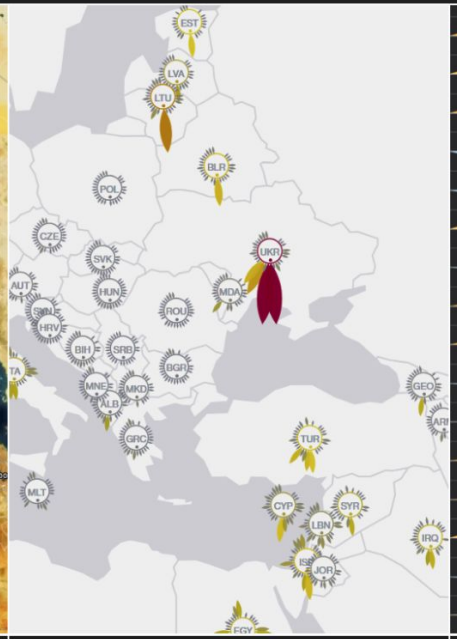


How Do We Compare?

Using metrics for global good

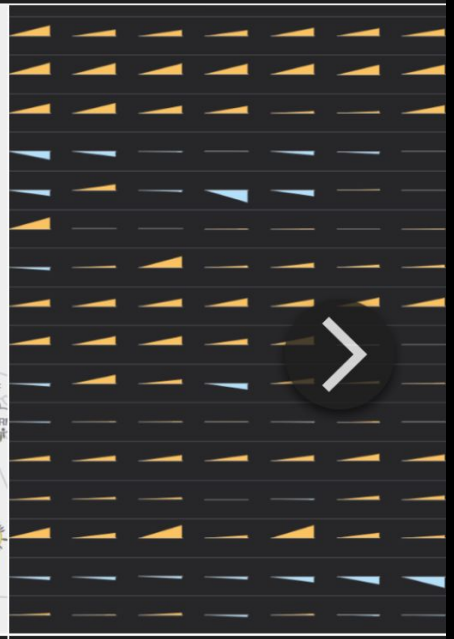
River Runner

Don't stop that drop



The Whole Picture

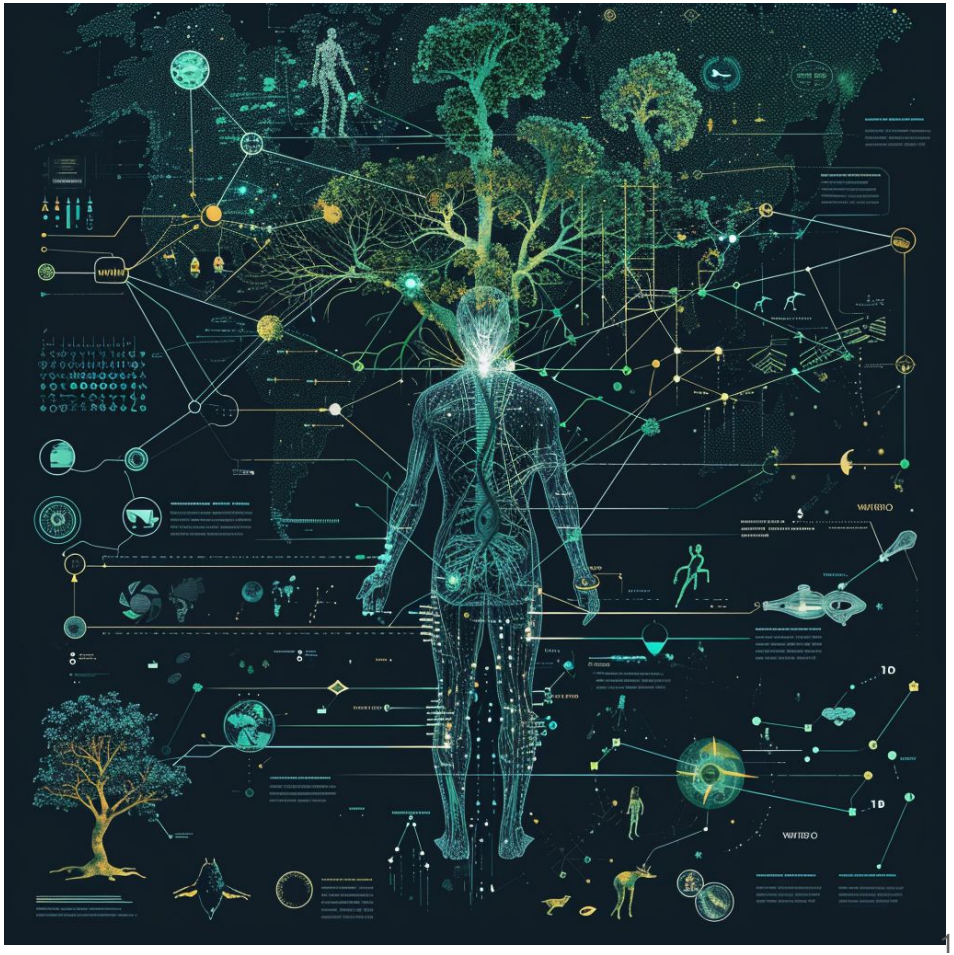
The cost of connectedness



The Shape of Change

A global progress report

3rd Decade of *Places & Spaces*: Envisioning Intelligences (2025-2034)



https://scimaps.org

wermind using https://www.midjourney.com

Envisioning Intelligences

Including

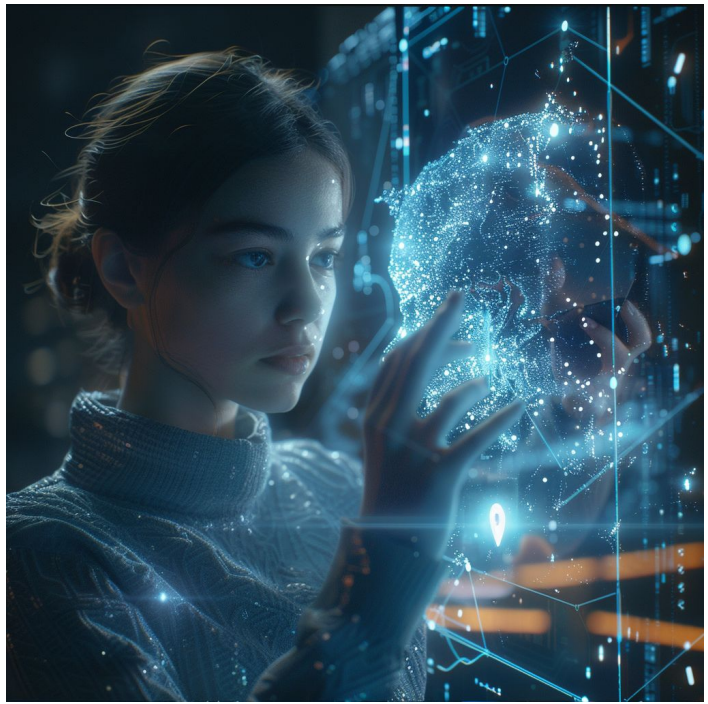
- linguistic, kinesthetic, communication, musical, emotional, and other intelligences by biological and technological life forms

with a focus on

- collaboration & coordination across life forms and intelligence types

to inspire discussion about

- existing and future sensors & actuators, memory & reasoning, exploration & communication, plus shared goals & desirable futures.



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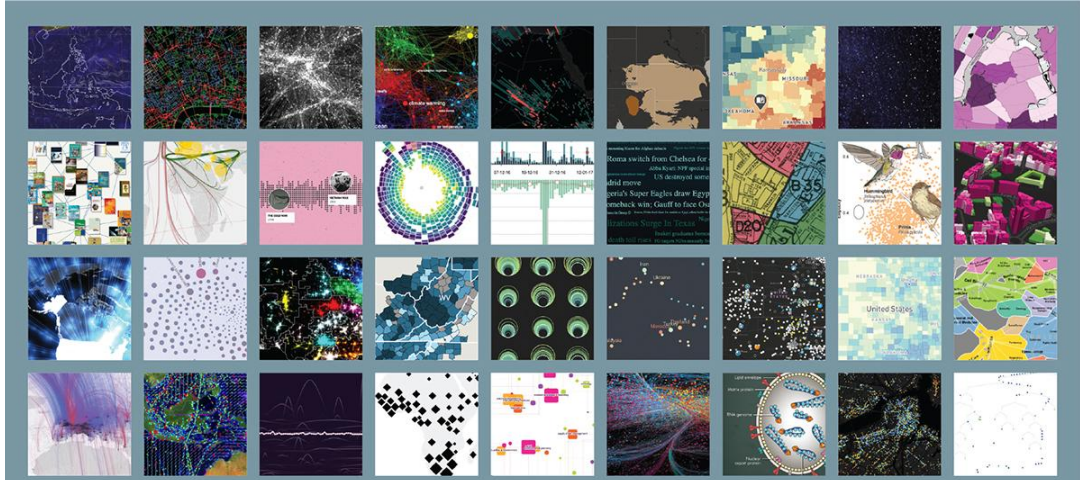
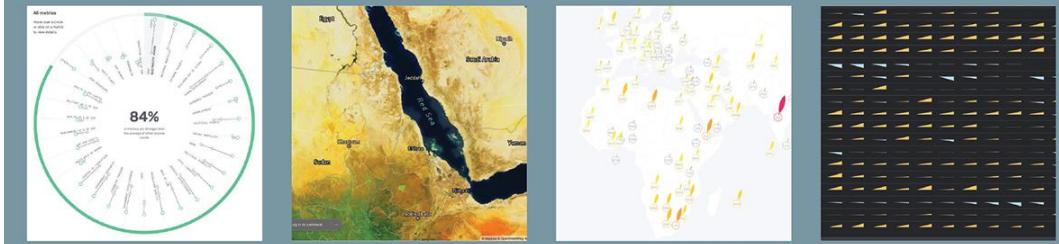
Talks



Macroscope Tools for Global Challenges



Past, Present, and Future Maps and Models of Science & Technology

By Katy Börner, Indiana University, USA

Katy Börner is the Victor H. Yngve Distinguished Professor of Engineering and Information Science in the Departments of Intelligent Systems Engineering and Information Science, Luddy School of Informatics, Computing, and Engineering; core faculty of the Cognitive Science Program; and founding director of the Cyberinfrastructure for Network Science Center (http://cns.iu.edu)—all at Indiana University in Bloomington, Indiana. She is a curator of the Mapping Science exhibit (http://scimaps.org) and she leads the international Human Reference Atlas effort (https://humanatlas.io). She holds an MS in electrical engineering from the University of Technology in Leipzig, and a PhD in computer science from the University of Kaiserslautern. Börner is a Fellow of the American Association for the Advancement of Science (AAAS), a Humboldt Research Fellow, an Association for Computing Machinery (ACM) Fellow, and a Network Society Fellow.

Skill Discrepancies

- Data and Crosswalks
- MaxMatch for NLP
- Causal Analyses
- Visualizations

Börner, Katy, Olga Scrivner, Mike Gallant, Shutian Ma, Xiaozhong Liu, Keith Chewning, Lingfei Wue, and James A. Evans. 2018. “Skill Discrepancies Between Research, Education, and Jobs Reveal the Critical Need to Supply Soft Skills for the Data Economy.” *PNAS* 115(50): 12630-12637.

CNS Cyberinfrastructure for Network Science Center

Skill discrepancies between research, education, and jobs reveal the critical need to supply soft skills for the data economy

Katy Börner[a,b,1], Olga Scrivner[a], Mike Gallant[a], Shutian Ma[a,c], Xiaozhong Liu[a], Keith Chewning[d], Lingfei Wu[e,f,g,h], and James A. Evans[f,g,i,1]

[a]School of Informatics, Computing, and Engineering, Indiana University, Bloomington, IN 47408; [b]Educational Technology/Media Centre, Dresden University of Technology, 01062 Dresden, Germany; [c]Department of Information Management, Nanjing University of Science and Technology, 210094 Nanjing, China; [d]Burning Glass Technologies, Boston, MA 02110; [e]School of Journalism and Communication, Nanjing University, 210008 Nanjing, China; [f]Department of Sociology, University of Chicago, Chicago, IL 60637; [g]Knowledge Lab, University of Chicago, Chicago, IL 60637; [h]Tencent Research Institute, 100080 Beijing, China; and [i]Santa Fe Institute, Santa Fe, NM 87501

Edited by William B. Rouse, Stevens Institute of Technology, Hoboken, NJ, and accepted by Editorial Board Member Pablo G. Debenedetti September 12, 2018 (received for review March 14, 2018)

Rapid research progress in science and technology (S&T) and continuously shifting workforce needs exert pressure on each other and on the educational and training systems that link them. Higher education institutions aim to equip new generations of students with skills and expertise relevant to workforce participation for decades to come, but their offerings sometimes misalign with commercial needs and new techniques forged at the frontiers of research. Here, we analyze and visualize the dynamic skill (mis-) alignment between academic push, industry pull, and educational offerings, paying special attention to the rapidly emerging areas of data science and data engineering (DS/DE). The visualizations and computational models presented here can help key decision makers understand the evolving structure of skills so that they can craft educational programs that serve workforce needs. Our study uses millions of publications, course syllabi, and job advertisements published between 2010 and 2016. We show how courses mediate between research and jobs. We also discover responsiveness in the academic, educational, and industrial system in how skill demands from industry are as likely to drive skill attention in research as the converse. Finally, we reveal the increasing importance of uniquely human skills, such as communication, negotiation, and persuasion. These skills are currently underexamined in research and undersupplied through education for the labor market. In an increasingly data-driven economy, the demand for “soft” social skills, like teamwork and communication, increase with greater demand for “hard” technical skills and tools.

science of science | job market | data mining | visualization | market gap analysis

Education has been a critical vehicle of economic growth and social progress throughout the modern era. Higher education doors. Some predictions say hundreds or even thousands of colleges and universities will close or merge in the coming years (4).

In addition, there seem to be major discrepancies and delays between leading scientific research, job market needs, and educational content. This has been particularly expressed with respect to science, technology, engineering, and mathematics jobs, where scientific and technological progress is rapid. Strategic decision making on what to teach, whom to hire, and what new research to fund benefits from a systematic analysis of the interplay between science and technology (S&T) developments, courses and degrees offered, and job market needs. Specifically, stakeholders in US higher education urgently need answers to the following questions. (*i*) Students: what jobs might exist in 5–10 years? What educational trajectories will best achieve my dream job? What core and specialized skills are required for what jobs and offered by what schools and programs? (*ii*) Teachers: what course updates are most needed? What balance of timely vs. timeless knowledge should I teach? How can I innovate in teaching and maintain job security or tenure? (*iii*) Universities: what programs should be created? What is my competition doing? How do I tailor programs to fit workforce needs? (*iv*) Science funders: how can S&T investments improve short- and long-term prosperity? Where will advances in knowledge also yield advances in skills and technology (5)? (*v*) Employers: what skills are needed next year and in 5 and 10 years? Which institutions produce the right talent? What skills are listed in job advertisements by my competition? How do I hire and train

This paper results from the Arthur M. Sackler Colloquium of the National Academy of Sciences, “Modeling and Visualizing Science and Technology Developments,” held Decem-

Study the (mis)match and temporal dynamics of S&T progress, education and workforce development options, and job requirements.

Challenges:

- Rapid change of STEM knowledge
- Increase in tools, AI
- Social skills (project management, team leadership)
- Increasing team size

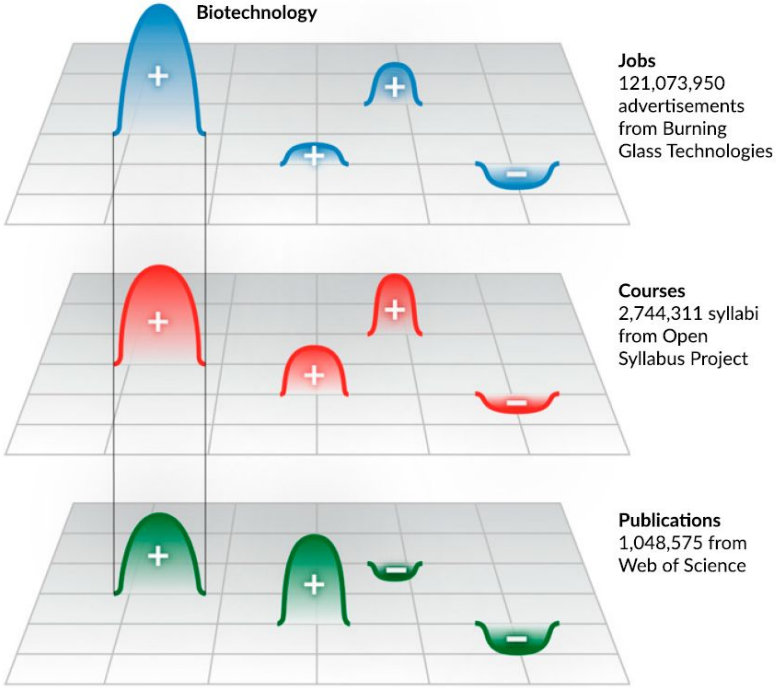


Fig. 1. The interplay of job market demands, educational course offerings, and progress in S&T as captured in publications. Color-coded mountains (+) and valleys (–) indicate different skill clusters. For example, skills related to Biotechnology might be mentioned frequently in job descriptions and taught in many courses, but they may not be as prevalent in academic publications. In other words, there are papers that mention these skills, but labor demand and commercial activity might be outstripping publication activity in this area. The numbers of jobs, courses, and publications that have skills associated and are used in this study are given on the right.

Kullback-Leibler divergence

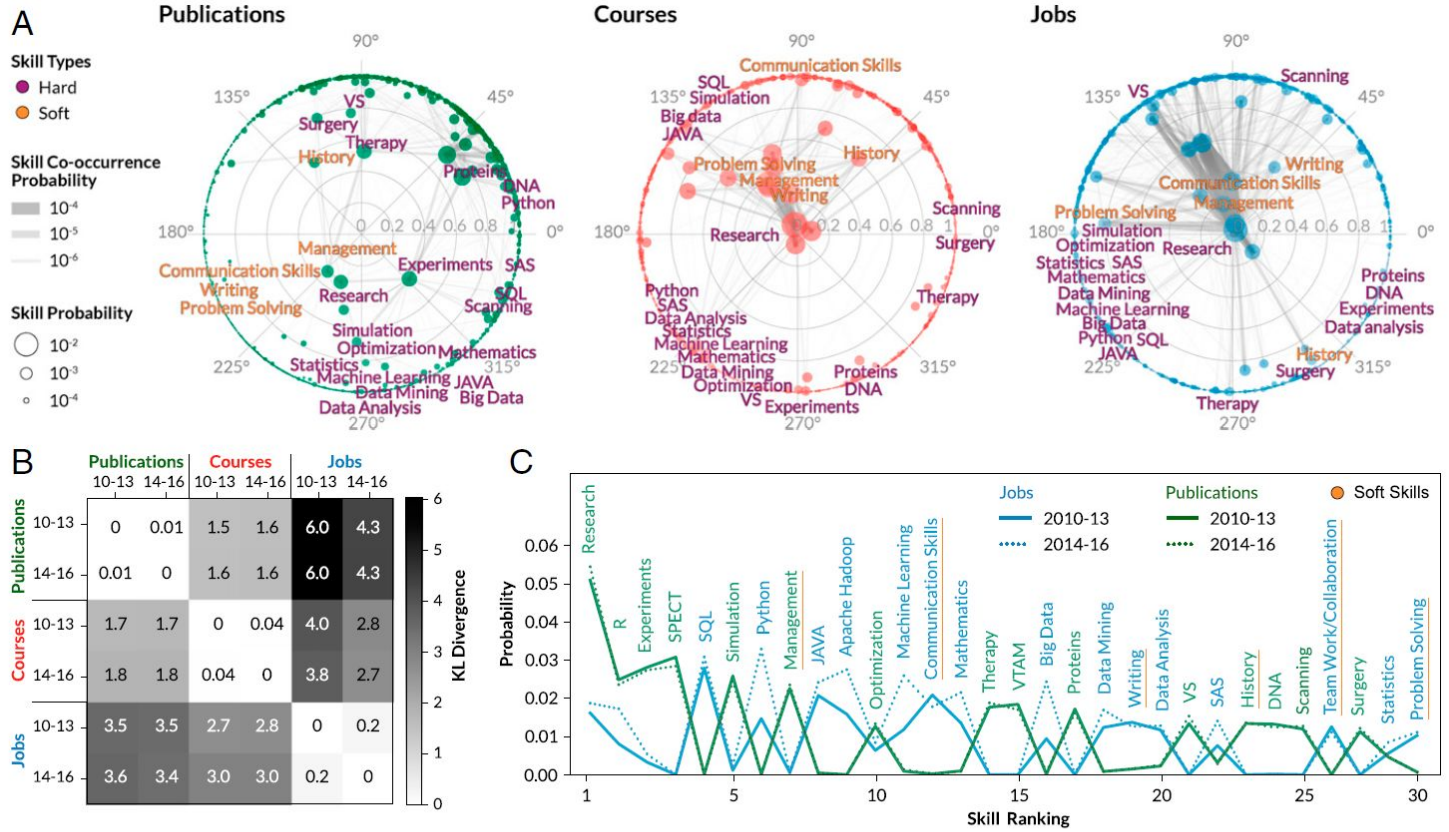


Fig. 5. Structural and dynamic differences between skill distributions in jobs, courses, and publications for 2010–2013 and 2014–2016. (*A*) Poincaré disks comparing the centrality of soft skills (orange) and hard skills (purple) across jobs, courses, and publications. (*B*) KL divergence matrix for jobs, courses, and publications in 2010–2013 and 2014–2016. (*C*) The most surprising skills in publications and jobs; *R* is a scripting language, VTAM refers to the IBM Virtual Telecommunication Access Method application, VS is the integrated development environment Visual Studio, and SAS is a data analytics software.

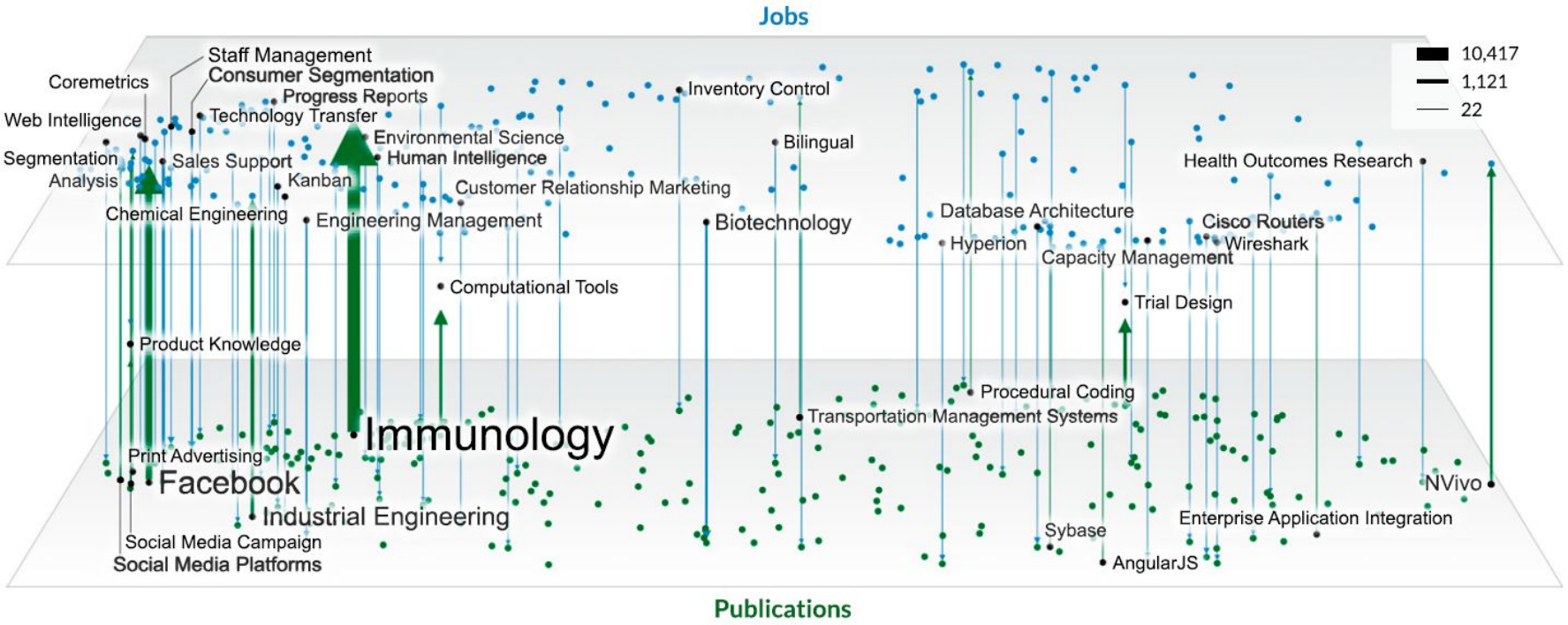
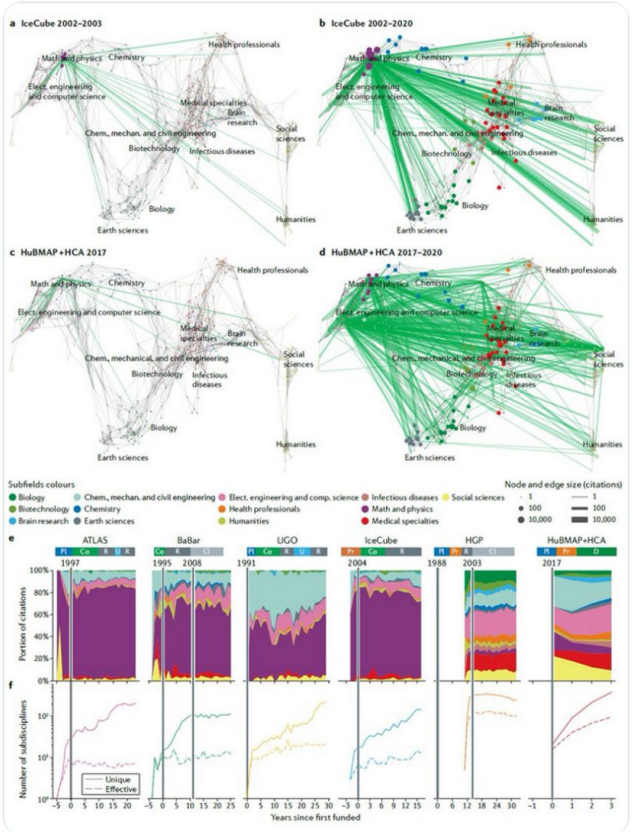


Fig. 6. Strength of influence mapping. Top 200 most frequent skills in jobs (blue) and in publications (green) plotted on the skills basemap from Fig. 2. Arrows represent skills with significant Granger causality (P value < 0.05). Line thickness and label size indicate skill frequency. The direction and thickness of each arrow indicate the F-value strength and direction.

Katy Borner
@katycns

Visualizing big science projects, with Filipi N. Silva and Staša Milojević, is out in @NatRevPhys, see rdcu.be/cyEG5. Explore interactive vis at bigscience.github.io then use code to map your very own projects. @IUNetSci @IULuddy @cnscenter @ieeevis @issi_pres



Check for updates

Visualizing big science projects

Katy Börner, Filipi Nascimento Silva and Staša Milojević

Abstract | The number, size and complexity of 'big science' projects are growing — as are the size, complexity and value of the data sets and software services they produce. In this context, big data gives a new way to analyse, understand, manage and communicate the inner workings of collaborations that often involve thousands of experts, thousands of scholarly publications, hundreds of new instruments and petabytes of data. We compare the evolving geospatial and topical impact of big science projects in physics, astronomy and biomedical sciences. A total of 13,893 publications and 1,139 grants by 21,945 authors cited more than 333,722 times are analysed and visualized to help characterize the distinct phases of big science projects, document increasing internationalization and densification of collaboration networks, and reveal the increase in interdisciplinary impact over time. All data sets and visual analytics workflows are freely available on GitHub in support of future big science studies.

'Big science' today is international, interdisciplinary and inter-institutional. Big science projects are anchored around expensive, large and complex instruments, they can run for several decades and they involve thousands of experts. Big science projects make breakthroughs not only in basic research but also in innovation that impacts economy and solves challenging societal needs. As more science fields move towards the big science model of knowledge creation, the lessons learned from previous successful endeavours become essential. This is because big science projects are not just larger and more expensive than other projects but they require specific organizational and management structures. Different knowledge production processes also bring new research roles, changes in the division of labour and adjustment in formal and informal scholarly communication. One way to communicate these aspects of big science, on which this Perspective focuses, is to use various visualizations. Visualizations in this Perspective — and interactive online ones — show that big science projects go through phases with different input needs, expected outputs and impacts. As big science projects mature, their collaborations densify and internationalize; at the same time, scholarly impact increases in terms of citation counts and interdisciplinary reach.

Big science as a phenomenon can be traced all the way back to fifteenth-century cartography and astronomy[2–4] or to eighteenth-century natural history expeditions[5,6]. Nineteenth-century extensive archival projects (the Corpus Inscriptionum Latinarum and the Carte du Ciel) had many characteristics of present-day big science in terms of funding (state backing by Prussia and France), workforce and timescale (requiring more than a lifetime of effort), and were associated with the initial coinage of the term 'big science' (or, originally, Gorswissenschaft) by classical philologist and Prussian Academy of Sciences member Theodor Mommsen[5]. The better known and more immediate precursors of what became known as big science are the establishment of the University of California cyclotron by Ernest Lawrence in the 1930s for energy research[6] and the World War II Manhattan Project[7]. The term 'big science', however, was introduced in the 1960s by Alvin M. Weinberg[8,9] and Derek J. De Solla Price[7] to describe post-World War II developments in physics that built large and very expensive instruments (reactors and accelerators), accompanied by the growth in scientific team sizes working on nuclear-related research[7]. Making advances in nuclear and, later, particle physics became part of the competition among superpowers, with the expectation that breakthroughs would lead to both scientific and technological superiority[10,11]. In addition, big science has been propelled into the general public's awareness by the founding of the National Aeronautics and Space Administration (NASA) and its active and publicly visible space programme[3]. Although most of the early focus regarding big science was on physics, as early as 1965, Weinberg[12] proposed that biomedical science and biomedical technology were ready to enter the 'big biology' era. This entry was made only in the 1990s with the Human Genome Project (HGP), the first big science project in biology[13]. The expansion of the big science mode of knowledge production to other areas of science, such as big biology, brought with it new organizational and collaborative forms, such as 'networked' science enabled by information and communication technologies[14] and some debates as to whether such coordinated efforts can be called big science[15,16].

Big science accentuated the central role instruments play in the development of science as "engines of discovery"[17]. Historically, instruments such as the telescope, the microscope and the air pump opened new vistas and led to scientific revolution, fundamentally changing the nature of scholarship[18–21]. The quest for increased sensitivity and accuracy of instruments led to their constant evolution, making these ever more expensive tools[19,22] obsolete fairly quickly[19]. This process has been described[23] as 'tinkering', in which 'lineages of technology' are adapted and combined, leading to networks, or 'genealogies' of technologies. However, the power of instruments, such as a scanning tunnelling microscope, can be realized only when they engage a community of researchers in what has been called 'an instrumental community', eventually leading to the formation of new scientific fields, such as nanotechnology[24]. Furthermore, the relationship between science and technology is complex and interdependent, with science also contributing to technology development[25–27].

Early scientists, such as Galileo Galilei and Isaac Newton, engaged in instrument building as well as theoretical and experimental work[28,29]. While not without precedent, instrument building

Human Reference Atlas Literature

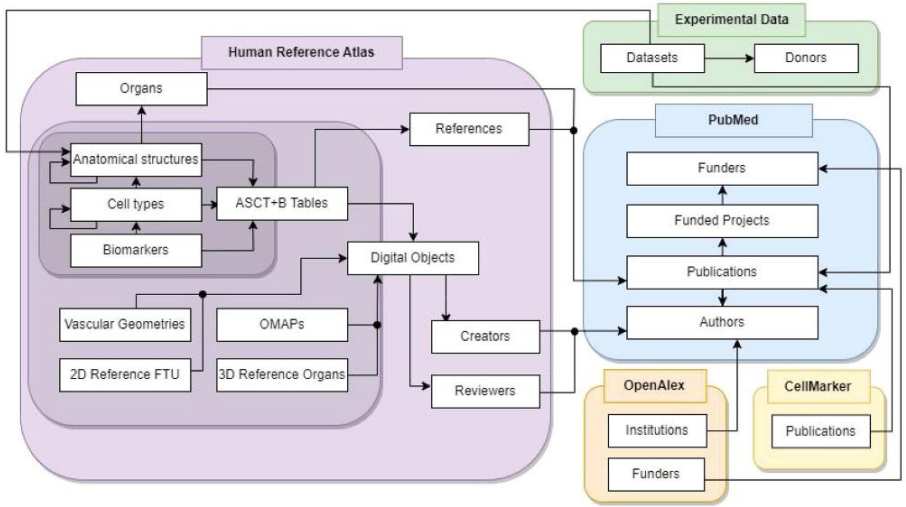


Fig. 1 Overview of the HRAlit database. HRA data types are linked to experimental data and to PubMed data using HuBMAP IDs of the HRA digital objects; experimental dataset IDs, donor IDs, and publication DOIs; PubMed publication PMIDs, author IDs, funding IDs, institution IDs, and funder IDs.

Kong, Yongxin, and Katy Börner. 2024. "Publication, funding, and experimental data in support of Human Reference Atlas construction and usage". *Scientific data* (574): https://doi.org/10.1038/s41597-024-03416-8.

www.nature.com/scientificdata

scientific data

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OPEN

DATA DESCRIPTOR

Publication, funding, and experimental data in support of Human Reference Atlas construction and usage

Yongxin Kong[1,2] & Katy Börner[1]

Experts from 18 consortia are collaborating on the Human Reference Atlas (HRA) which aims to map the 37 trillion cells in the healthy human body. Information relevant for HRA construction and usage is held by experts, published in scholarly papers, and captured in experimental data. However, these data sources use different metadata schemas and cannot be cross-searched efficiently. This paper documents the compilation of a dataset, named HRAlit, that links the 136 HRA v1.4 digital objects (31 organs with 4,279 anatomical structures, 1,210 cell types, 2,089 biomarkers) to 583,117 experts; 7,103,180 publications; 896,680 funded projects, and 1,816 experimental datasets. The resulting HRAlit has 22 tables with 20,939,937 records including 6 junction tables with 13,170,651 relationships. The HRAlit can be mined to identify leading experts, major papers, funding trends, or alignment with existing ontologies in support of systematic HRA construction and usage.

Background & Summary

Constructing an atlas of the healthy human body is a massive undertaking due to the multiscale, biological complexity of human physiology. Since March 2020, international experts funded by the National Institutes of Health and/or supported by the Human Cell Atlas have been collaborating on the construction of a Human Reference Atlas (HRA)[1]. The 5th release of the HRA (v1.4) was published in June 2023 and comprises 31 organs with 4,279 unique anatomical structures, 1,210 unique cell types, 2,089 unique biomarkers linked to 32 Anatomical Structures, Cell Types, plus Biomarkers (ASCT + B) tables, 21 two-dimensional functional tissue units (FTU), and 65 three-dimensional, anatomically correct reference organs[2]. A total of 101 experts created and 99 experts reviewed (158 unique experts with ORCID IDs) the HRA digital objects across all releases and compiled 420 papers with DOIs that provide scholarly evidence for the anatomical structures, cell types, and biomarkers in the 31 ASCT + B tables.

As the HRA grows in the number of organs and data types it captures, it becomes important to use data-driven decision making to ensure systematic and efficient collaboration of scholars from different areas of research and development; federation of experimental data from different laboratories and data portals across scales (whole body to subcellular); and strategic foresight when setting data acquisition, tool development, and funding priorities.

In parallel to atlas construction, many high-quality experimental datasets are becoming available via data portals developed and served by Human BioMolecular Atlas Program (HuBMAP)[3], Cellular Senescence Network (SenNet)[4], Kidney Precision Medicine Project (KPMP)[5,6], GenitoUrinary Developmental Molecular Anatomy Project (GUDMAP)[7], the Genotype-Tissue Expression (GTEx)[8], or CZ CELLxGENE[9]. However, the portals use different metadata schemas and few provide DOIs for papers and only some offer API access—searching for data across portals is difficult or impossible.

Moreover, HRA relevant data is published in scholarly papers. Each month, more than 80,000 papers are published in PubMed making it difficult to keep track of expertise, methods, data, or code. *Scientific Data* papers typically focus on ontologies[10–12] or experimental data[13–15] while science of science studies commonly focus on

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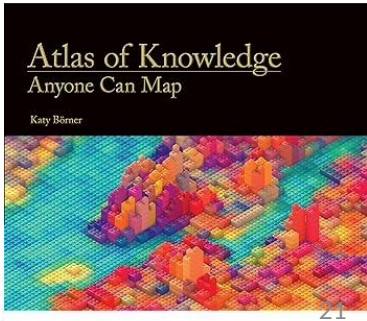
Atlas of Knowledge

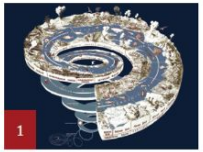
Contents

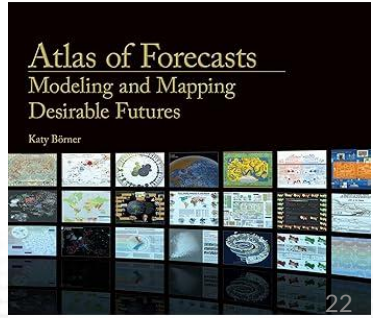


CNS Cyberinfrastructure for Network Science Center

Atlas of Forecasts

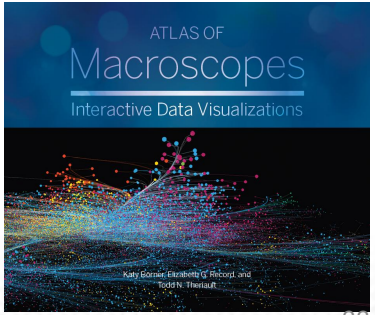
Contents





Atlas of Macroscopes

Contents



Global mapping of polarization and ideological alignment on Twitter and its effect on elections by

By David Chavalarias, Paris, France

David Chavalarias is the Director of the Paris Complex Systems Institute (http://iscpif.fr) and permanent CNRS researcher at the Center of Social Analysis and Mathematics (EHESS). His research is situated at the crossroads between the cognitive sciences and the science of complex systems, which he mobilizes for the study of social and cognitive dynamics, both from the point of view of the modeling and the reconstruction of social dynamics from large scale Web data.

Global mapping of polarization and ideological alignment on Twitter and its effect on elections

David Chavalarias

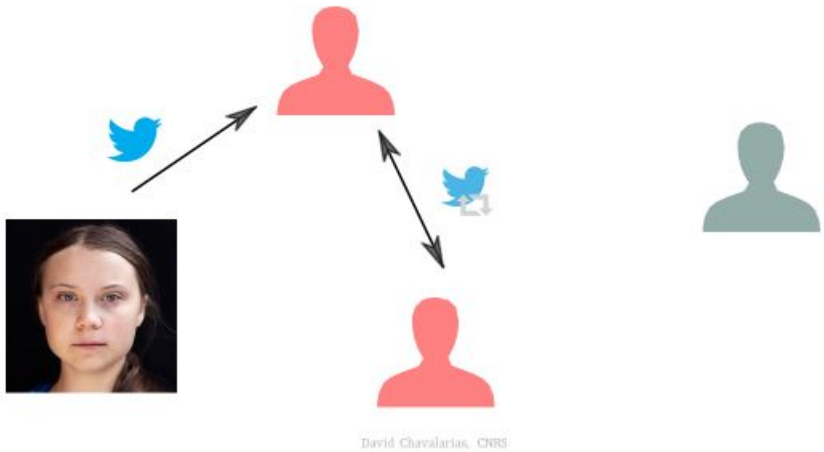
Directeur de Recherche CNRS

http://chavalarias.org

Macroscope Tools for Global Challenges
Indiana University Sept 20 2024

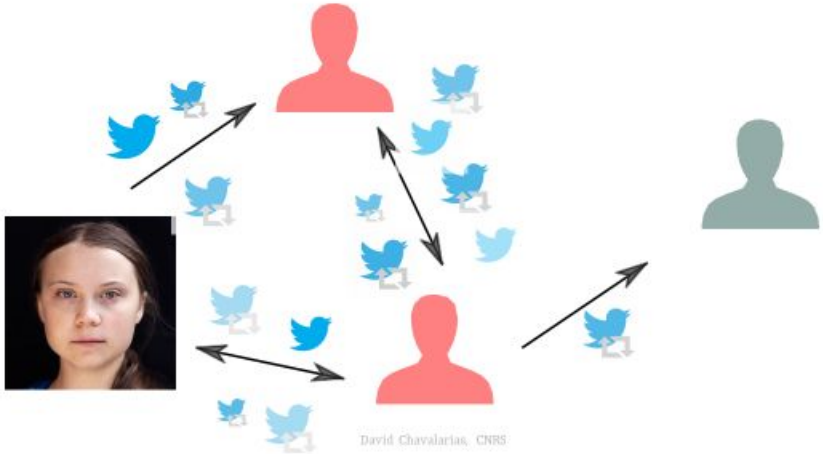
Global Mapping through the TwitterX lens

The recurrence of ideological retweets (without modification), often reflects the adherence to the opinions of their author.



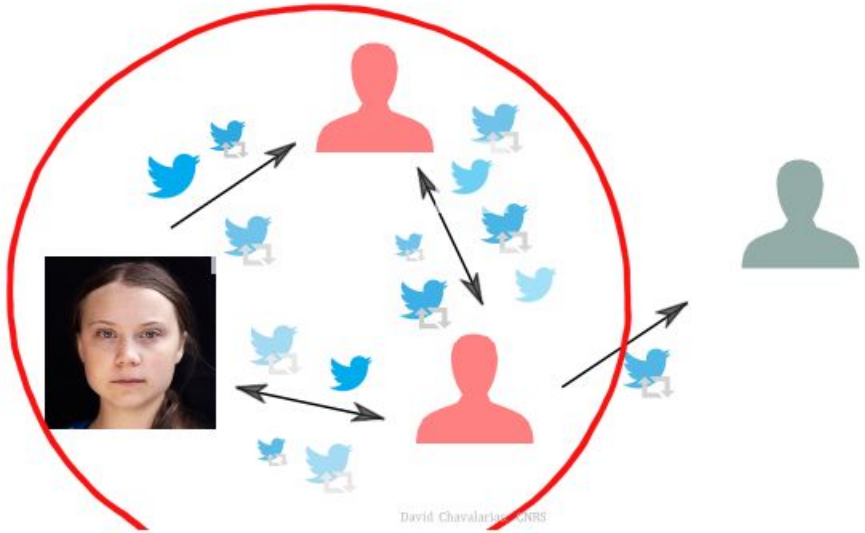
Identification of communities on Twitter

Information circulates preferentially among people with the same ideological views.

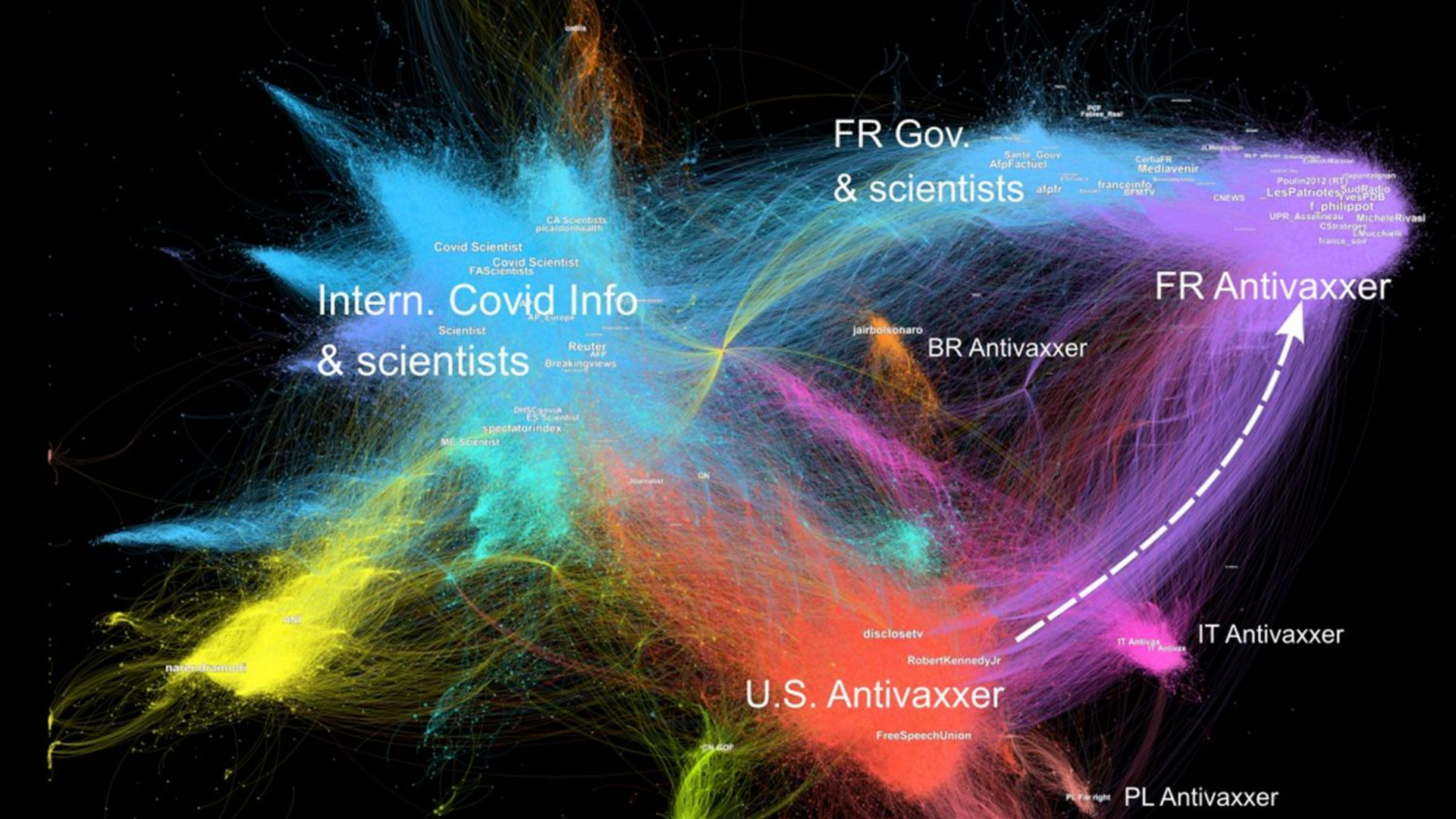


Identification of communities on Twitter

Online communities can be defined as the dense areas of the retweet graph.



Chavalarias et al. 2023. The new fronts of denialism and climate skepticism <hal-04103183>, ISC-PIF working papers


FR Gov.
& scientists
Intern. Covid Info
& scientists
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BR Antivaxxer
IT Antivaxxer
U.S. Antivaxxer
PL Antivaxxer
Covid Scientist
Covid Scientist
FAScientists
CA Scientists
picardonhealth
Scientist
Reuter
AFP
Breakingviews
spectatorindex
ME_Scientist
jairbolsonaro
disclosetv
RobertKennedyJr
FreeSpeechUnion
Sante_Gouv
AfpFactuel
CerfiaFR
Mediavenir
afpfr
franceinfo
BFMTV
CNEWS
SudRadio
_LesPatriotes
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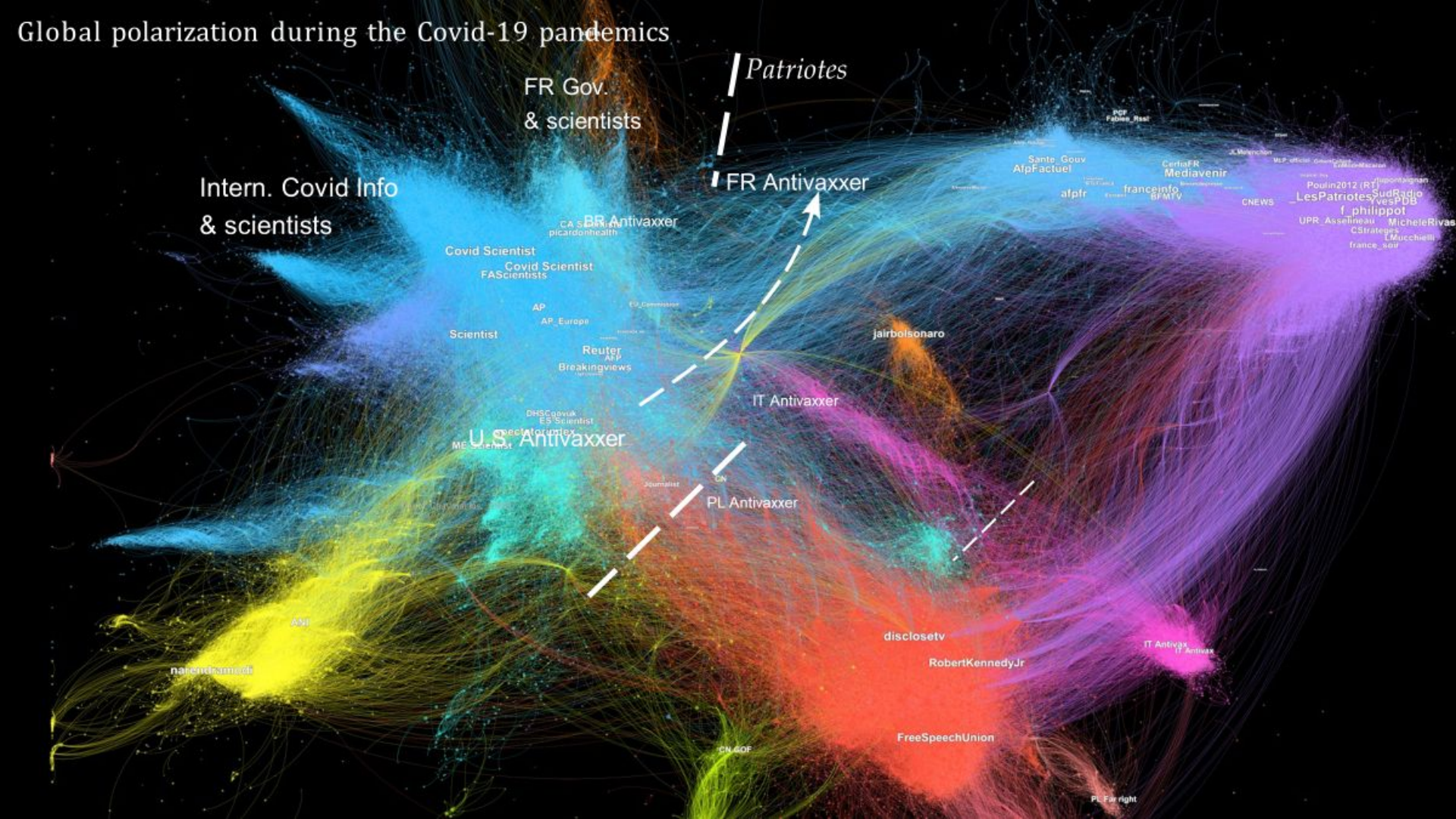
LMucchielli
france_soir
IT Antivax


Global polarization during the Covid-19 pandemics
FR Gov.
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Scientist
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AP_Europe
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Breakingviews
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Sante_Gouv
AfpFactuel
CerfiaFR
Mediavenir
afpfr
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BFMTV
CNEWS
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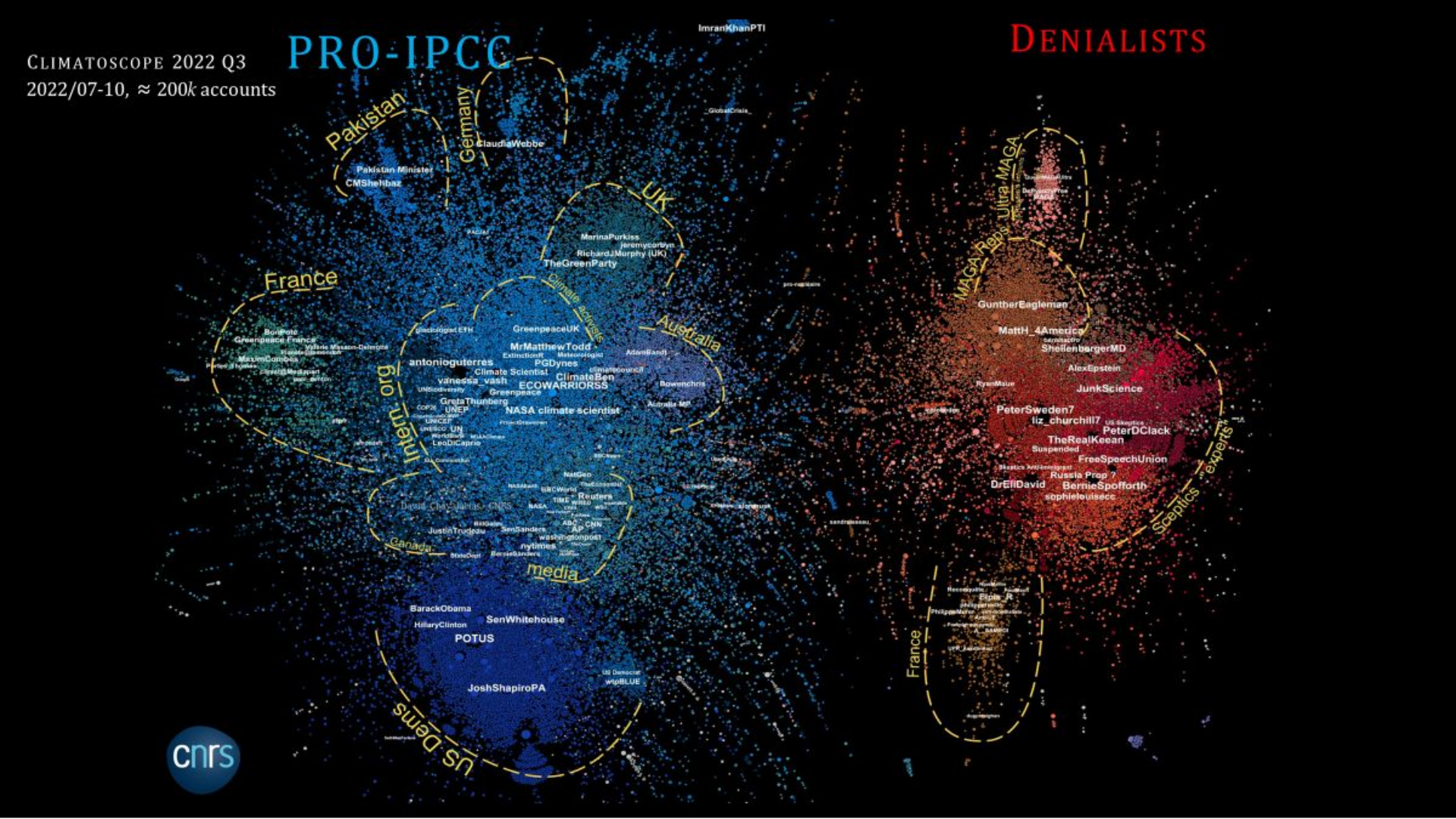
MicheleRivas
disclosetv
RobertKennedyJr
FreeSpeechUnion
narendramodi
PL Far right


CLIMATOSCOPE 2022 Q3
2022/07-10, ≈ 200k accounts
PRO-IPCC
DENIALISTS
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media
inter-org
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MAGA Reps
Ultra MAGA
Skeptics
experts
ImranKhanPTI
ClaudiaWebbe
Pakistan Minister
CMShehbaz
MarinaPurkiss
Jeremycorbyn
RichardJMurphy (UK)
TheGreenParty
BonPote
Greenpeace France
antonioguterres
Climate Scientist
vanessa_vash
GretaThunberg
UNEP
UN
LeoDiCaprio
GreenpeaceUK
MrMatthewTodd
PGDynes
ClimateBen
ECOWARRIORSS
Greenpeace
NASA climate scientist
NatGeo
Reuters
AP
CNN
JustinTrudeau
SenSanders
washingtonpost
nytimes
BernieSanders
BarackObama
HillaryClinton
SenWhitehouse
POTUS
JoshShapiroPA
GunterEagleman
MattH_4America
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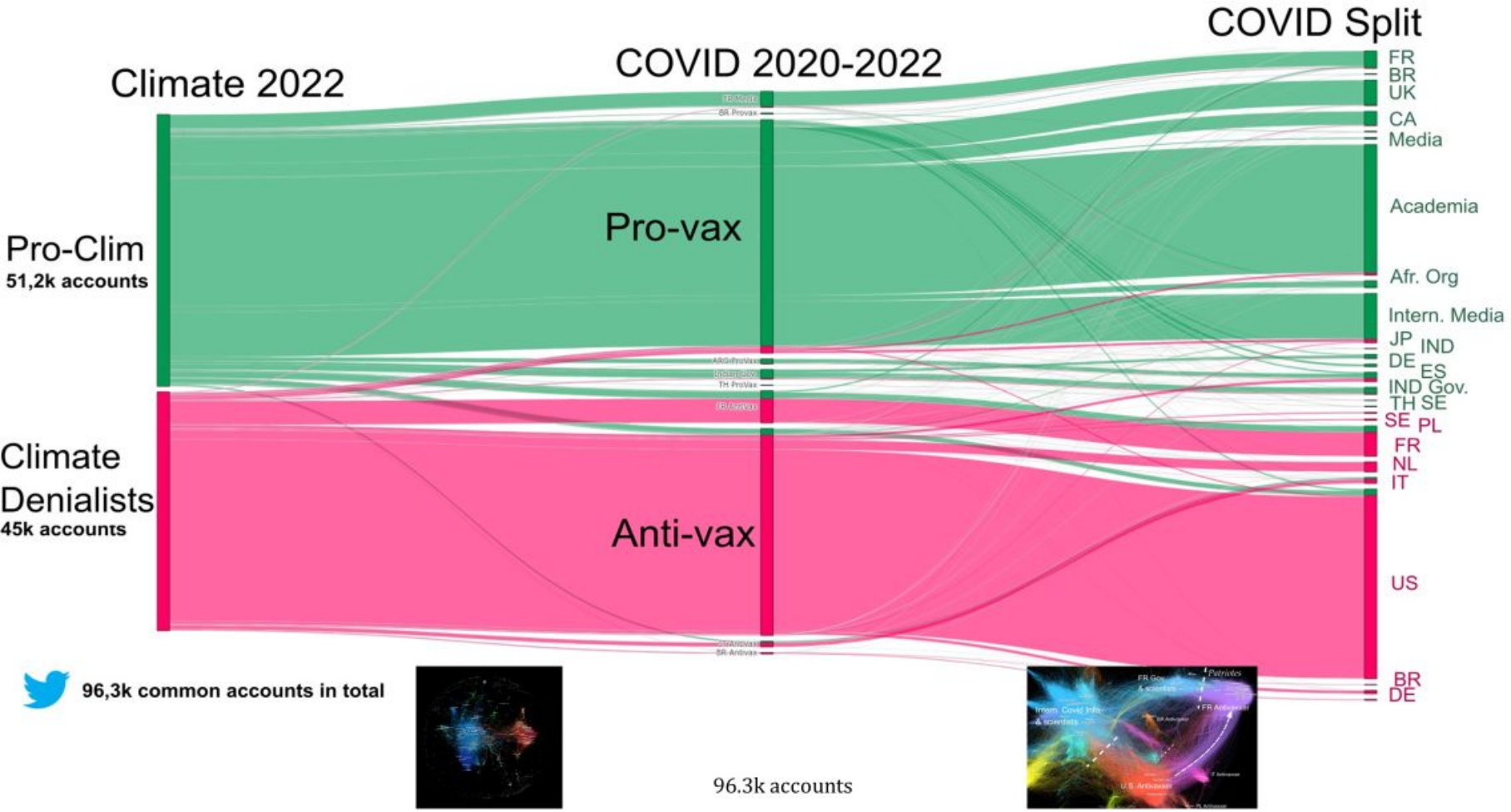
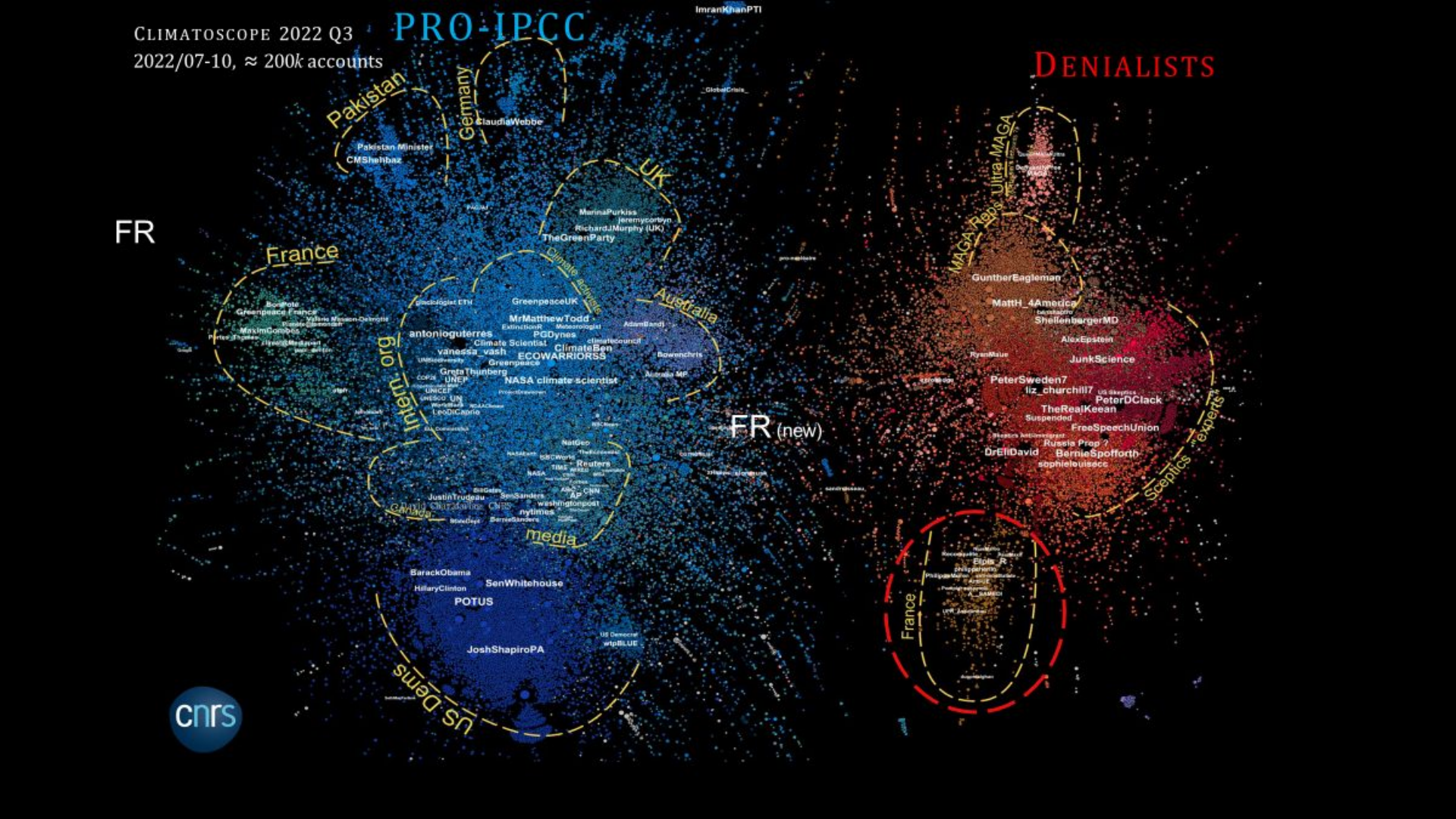


GLOBAL ALIGNMENT OF MULTI-TOPICS POLARIZATION

David Chavalarias, CNRS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MAGA Reps
Sceptics "experts"
France
ImranKhanPTI
ClaudiaWebbe
Pakistan Minister
CMShehbaz
MarinaPurkiss
jeremycorbyn
RichardJMurphy (UK)
TheGreenParty
GreenpeaceUK
MrMatthewTodd
antonioguterres
PGDynes
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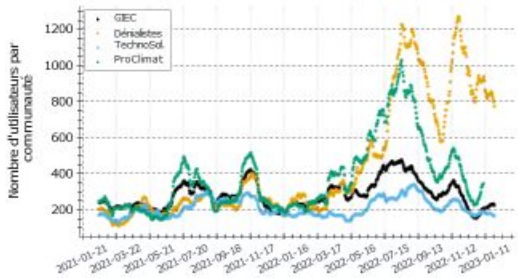
ClimateBen
ECOWARRIORSS
Greenpeace
GretaThunberg
NASA climate scientist
UNEP
UNICEF
UN
NatGeo
Reuters
AP
CNN
washingtonpost
nytimes
JustinTrudeau
SenSanders
BarackObama
HillaryClinton
SenWhitehouse
POTUS
JoshShapiroPA
GunntherEagleman
MattH_4America
ShellenbergerMD
AlexEpstein
JunkScience
PeterSweden7
liz_churchill7
PeterDClack
TheRealKeean
FreeSpeechUnion
Russia Prop ?
DrEliDavid
BernieSpofforth
sophielouisacc
cnrs

The case of French climate denialists community in 2022:

- Born in July 2022
- 83% contributed to the "anti-vax" movement
- 80.5% have relayed Kremlin's propaganda about Ukraine war, NATO or Zelensky



×6 the number of active French climate denialist accounts in less than 6 months

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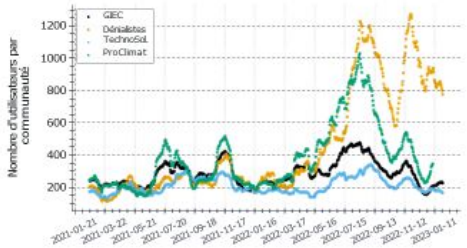

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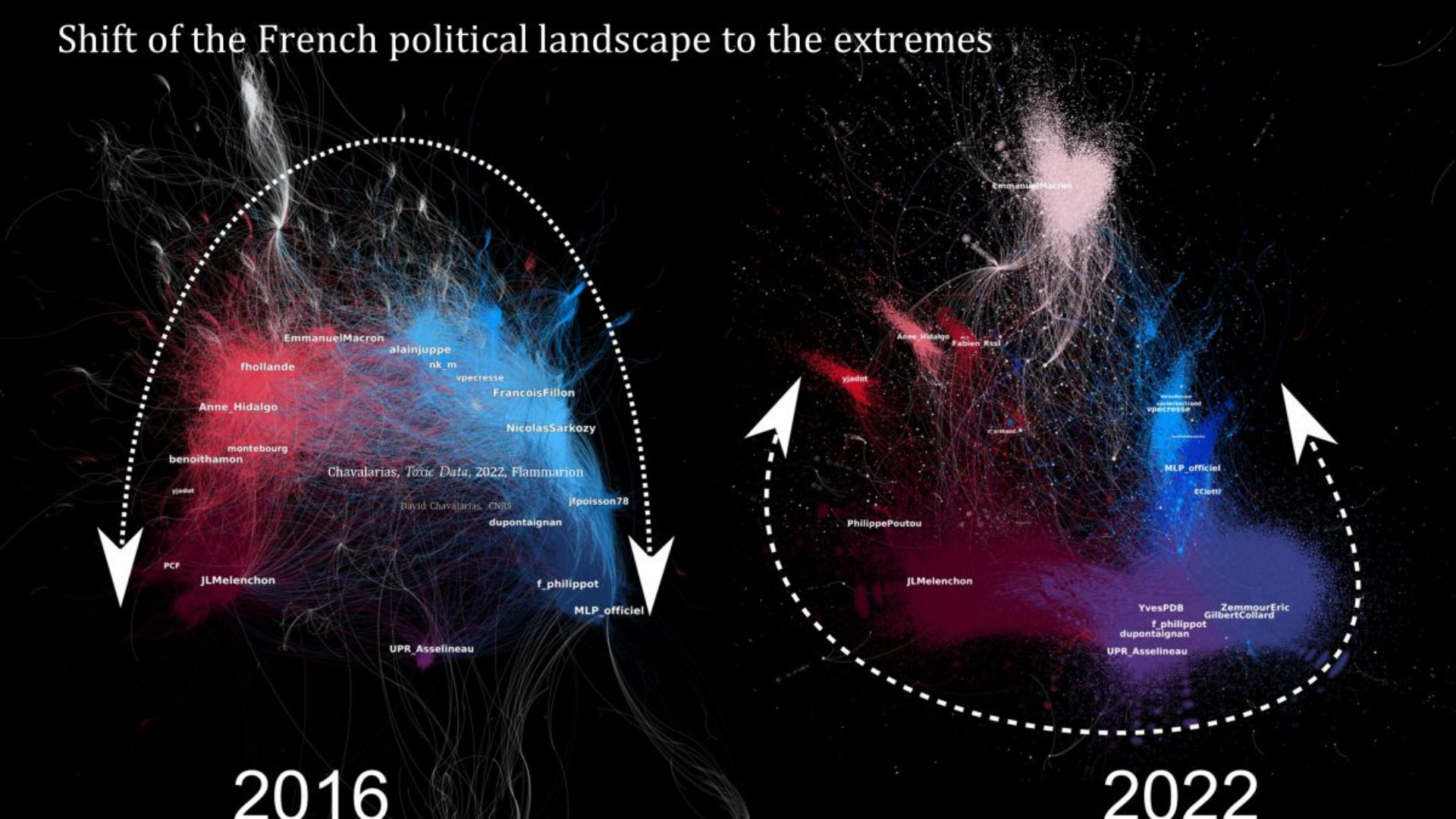
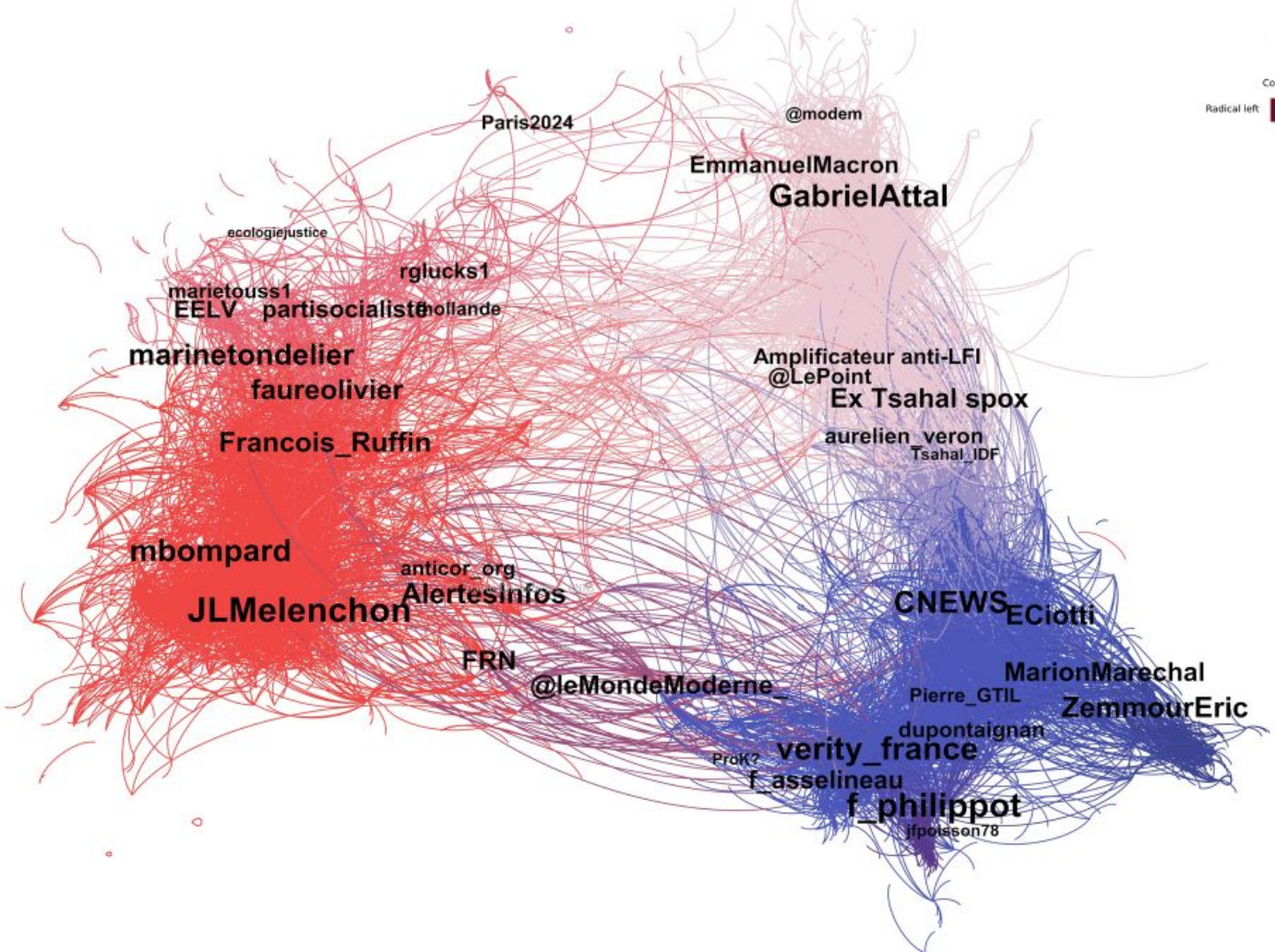
How to win an election with polarization ?

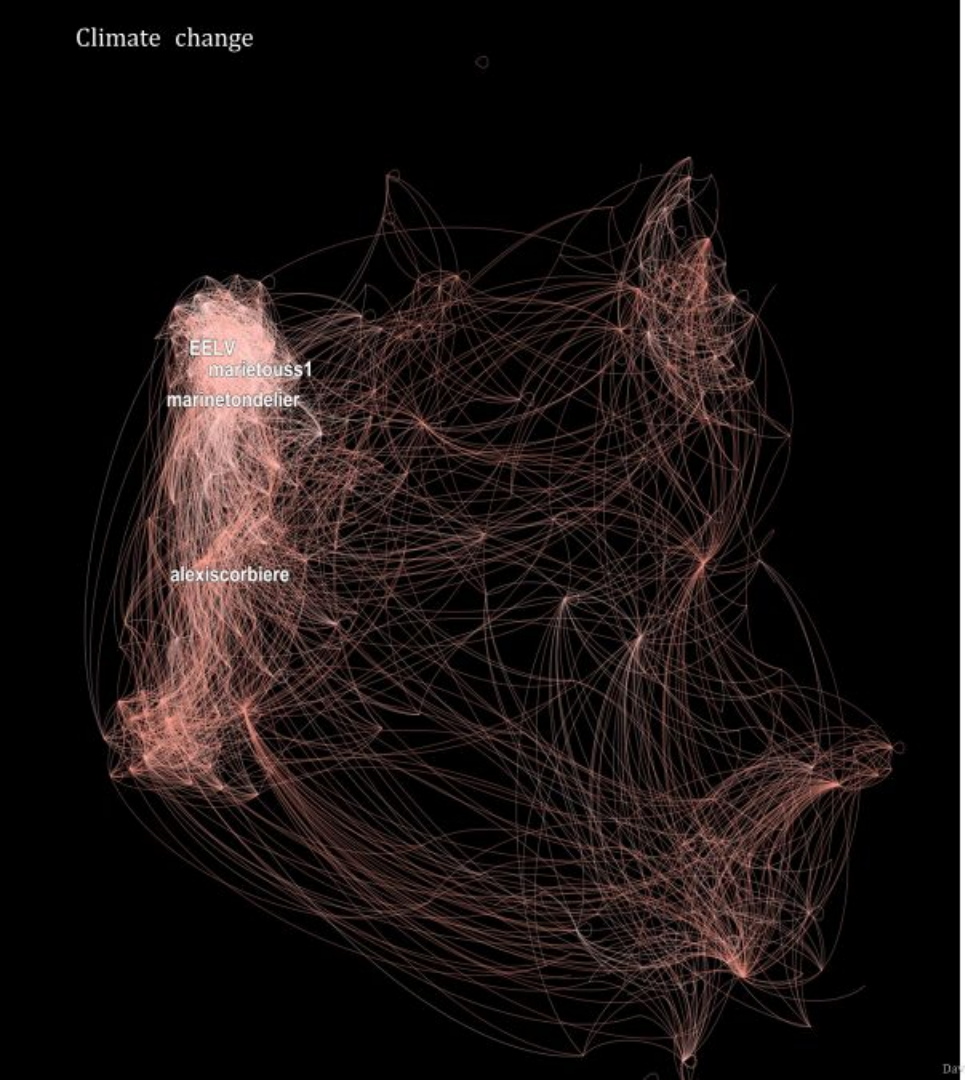
Shift of the French political landscape to the extremes





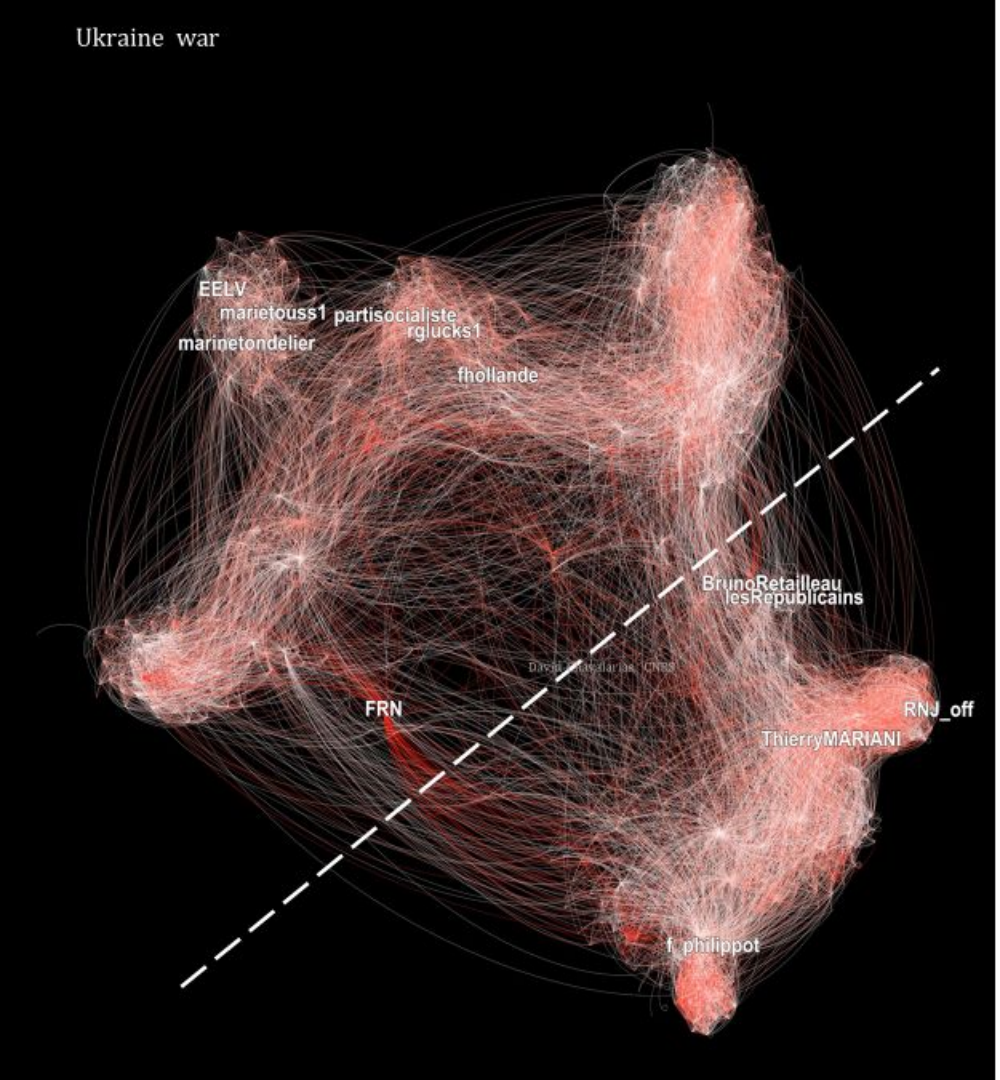
Parliament election 2024

- **3 forces :** Left, Center-right and Far-right
- **Pre-first-round poll:** far right will have absolute majority if other political forces do not unite
- **Challenge for pro far-right actors:** preventing union



Climate change

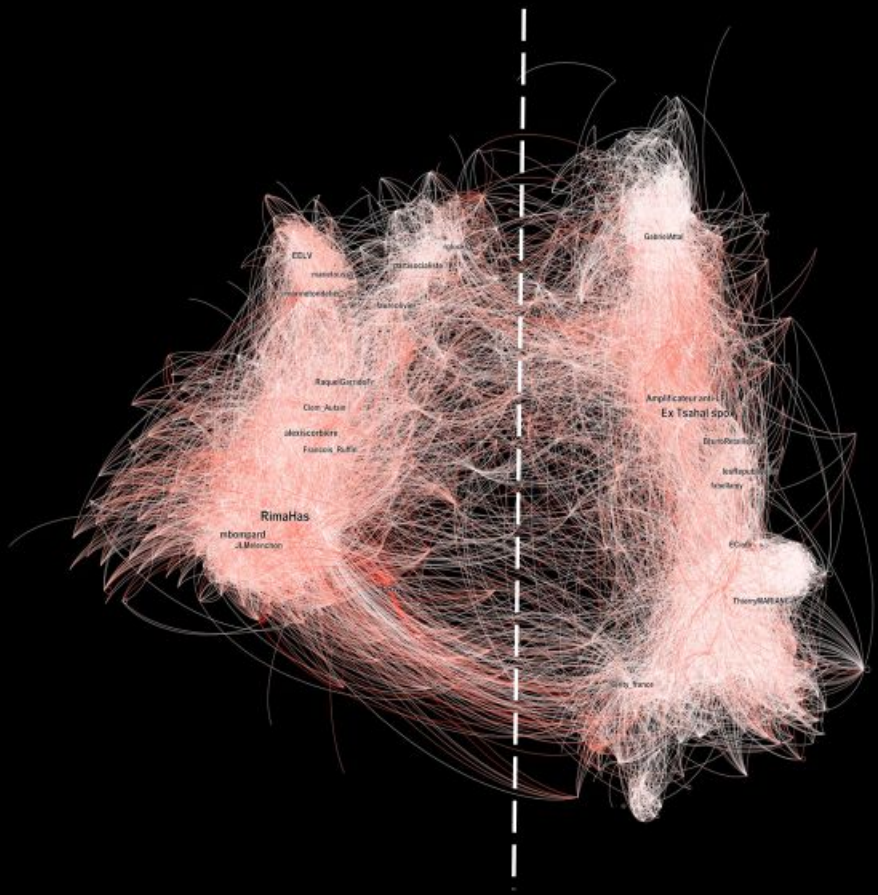
Left **vs.** ....



Ukraine war

Left & right **vs.** Far-right

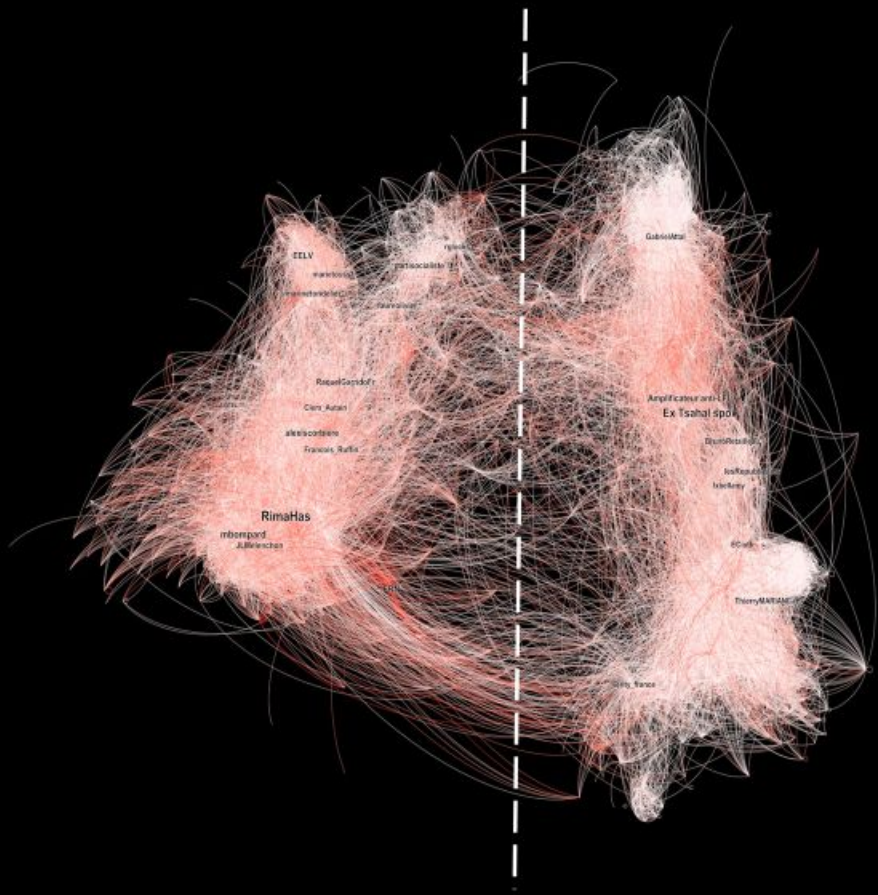
Israelo-palestinian conflict



Israelo-palestinian conflict

Left **vs.** Right and Far-right

Israelo-palestinian conflict

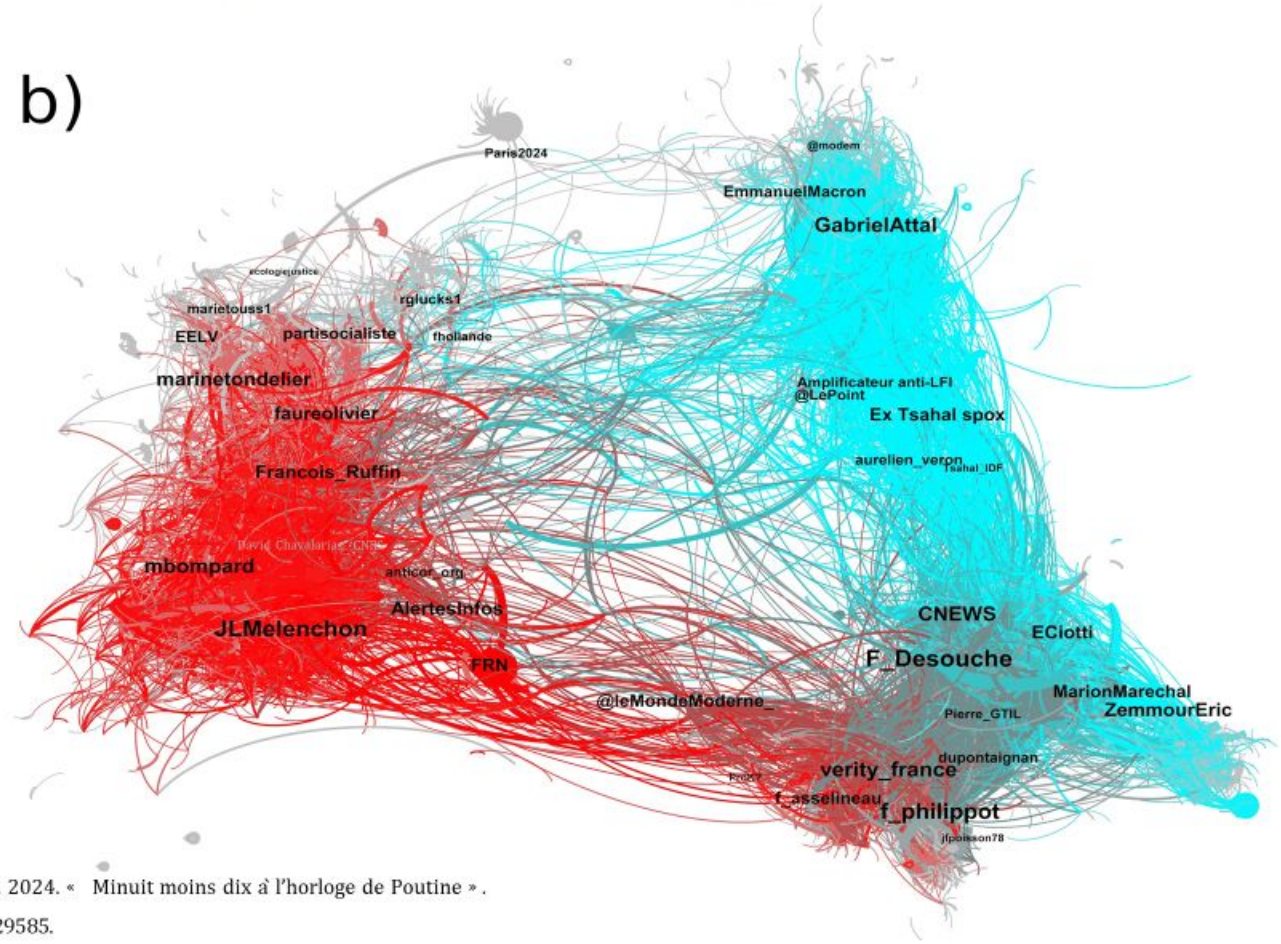


Israelo-palestinian conflict

Left **vs.** Right and Far-right

This was the media agenda to impose by all means

Online operations have been forcing the Israelo-palestinian framing during the French EU and legislative elections to favor far-right



Source: Chavalarias, David. 2024. « Minuit moins dix à l'horloge de Poutine ». https://hal.science/hal-04629585.

What about the US ?

Absurd fake news is an effective way of imposing a favorable media agenda and diverting attention from less favorable topics.
The media are the targets...

Maziyar Panahi - Victor Chomel - Paul Bouchaud

David Chavalarias

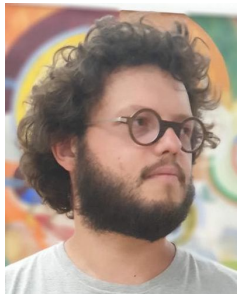
THANKS FOR YOUR ATTENTION

chavalarias.org

iscpif.fr

Exploring Archives Through Entities and their Relations

By Nicolas Gutehrlé and Iana Atanassova



Nicolas Gutehrlé is a postdoctoral researcher in the InSciM project at the University of Franche-Comté (France). He is specialised in the Natural Language Processing and Digital Humanities fields. More specifically, his work focuses on the conception and application of Information Extraction and Information Retrieval methods to assist in the exploration and exploration of corpora from the humanities. He is also committed to the dissemination of scientific knowledge, having organised numerous scientific events, as well as events aimed at popularising science in France.

Iana Atanassova is the director of the CRIT laboratory at the University of Franche-Comté in France. She specializes in Natural Language Processing (NLP) and linguistics. Her research focuses on semantic processing and information extraction from scientific texts. She leads several interdisciplinary projects addressing challenges such as uncertainty mining in scientific discourse, as well as text analysis and information extraction in the humanities.

Exploring Archives through Entities and Relations

Macroscope Tools for Global Challenges
20/09/2024

Nicolas Gutehrlé[1] & **Iana Atanassova**[1, 2]

[1] C.R.I.T., Université de Franche-Comté, France

[2] Institut Universitaire de France (IUF)

Introduction

- In the last decades, archives and libraries have massively digitised their collections, thus opening them to a wider audience
- The application of methods such as OCR allows to extract the textual content of documents, and allows to explore them through search engines

Source gallica.bnf.fr / Bibliothèque nationale de France

Introduction

- The exploration and exploitation of archival collections remains challenging:
  - abundance of documents retrieved by a keyword search
  - lack of structure of their textual content obtained by OCR

- Documents can be structured by adding semantic annotations (e.g. people, locations, dates) to their textual content, which can be exploited by search engines (e.g. NewsEye, impresso) [1, 2]

- Semantic annotations can be exploited further to build augmented search interfaces which provide a novel perspective on the collections, and allow to switch between close and distant reading [3] of the collections [4–6]

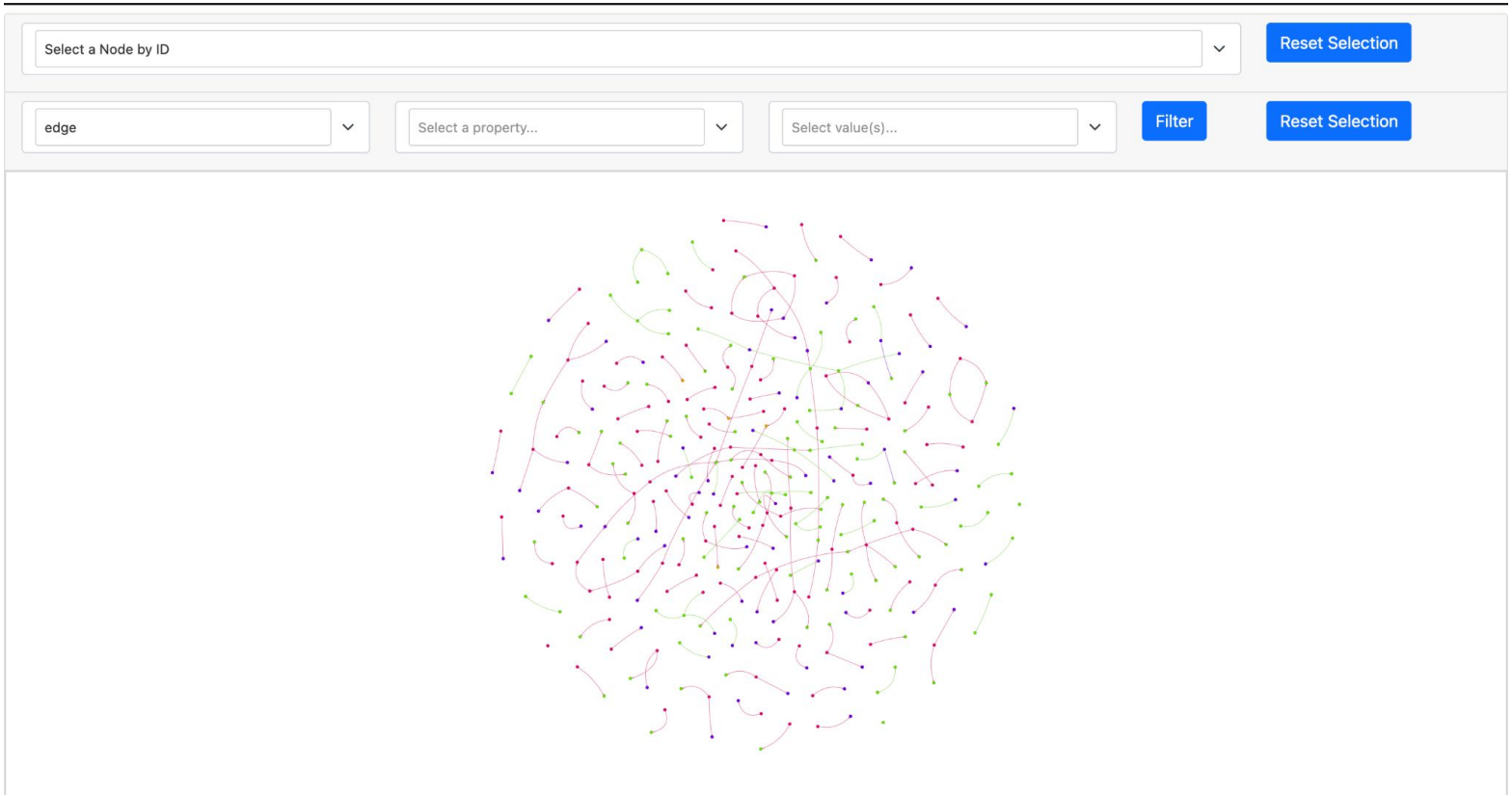
Proposal

We propose an augmented search interface to explore collections of historical documents through the lens of entities mentioned in texts and through their relations:

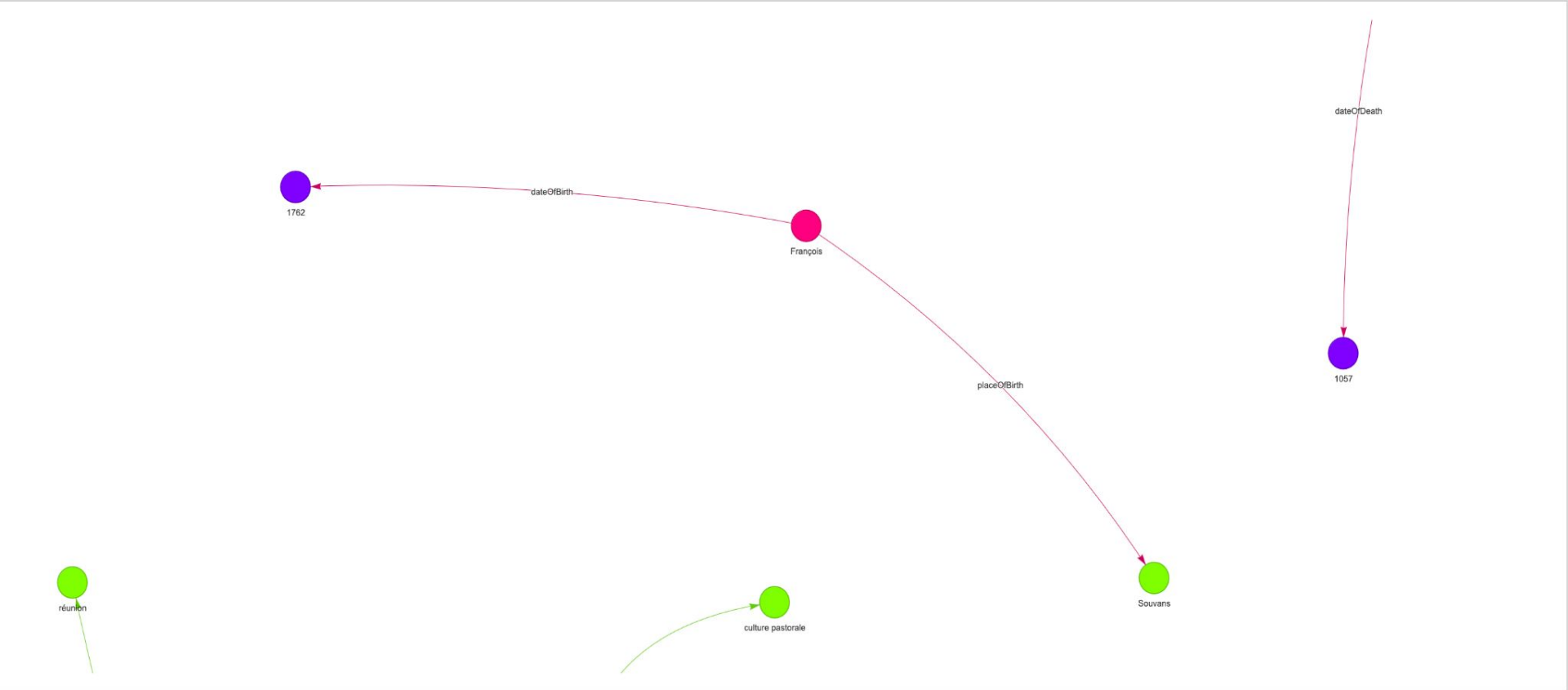
- Part of the EMONTAL project, funded by the Bourgogne Franche-Comté region in France (2020-2023)
- Built upon a corpus of periodicals published in the 19th and 20th centuries in France
- Entity mentions and their relations extracted by applying the ELIJERE method [7]

Initial prototype built with the Python library pyviz

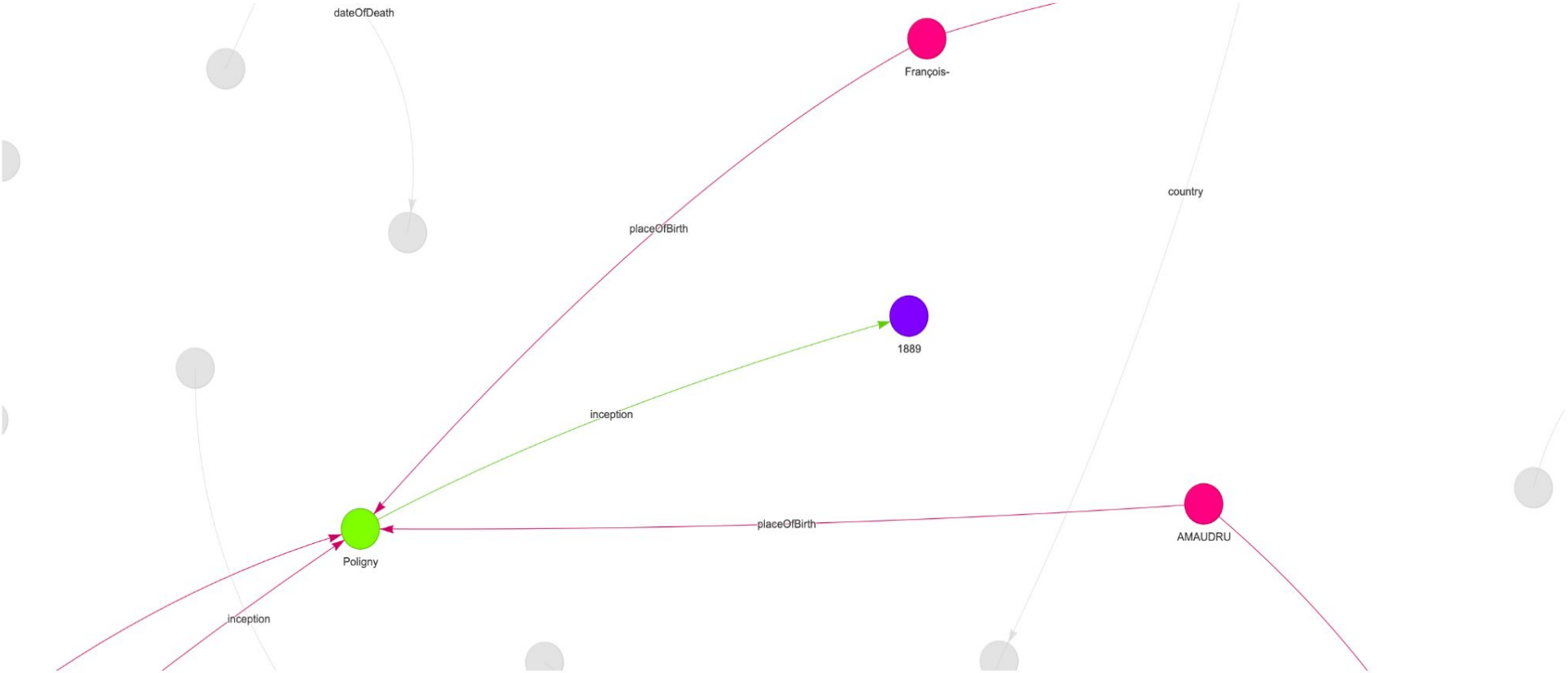
Prototype interface



Prototype interface



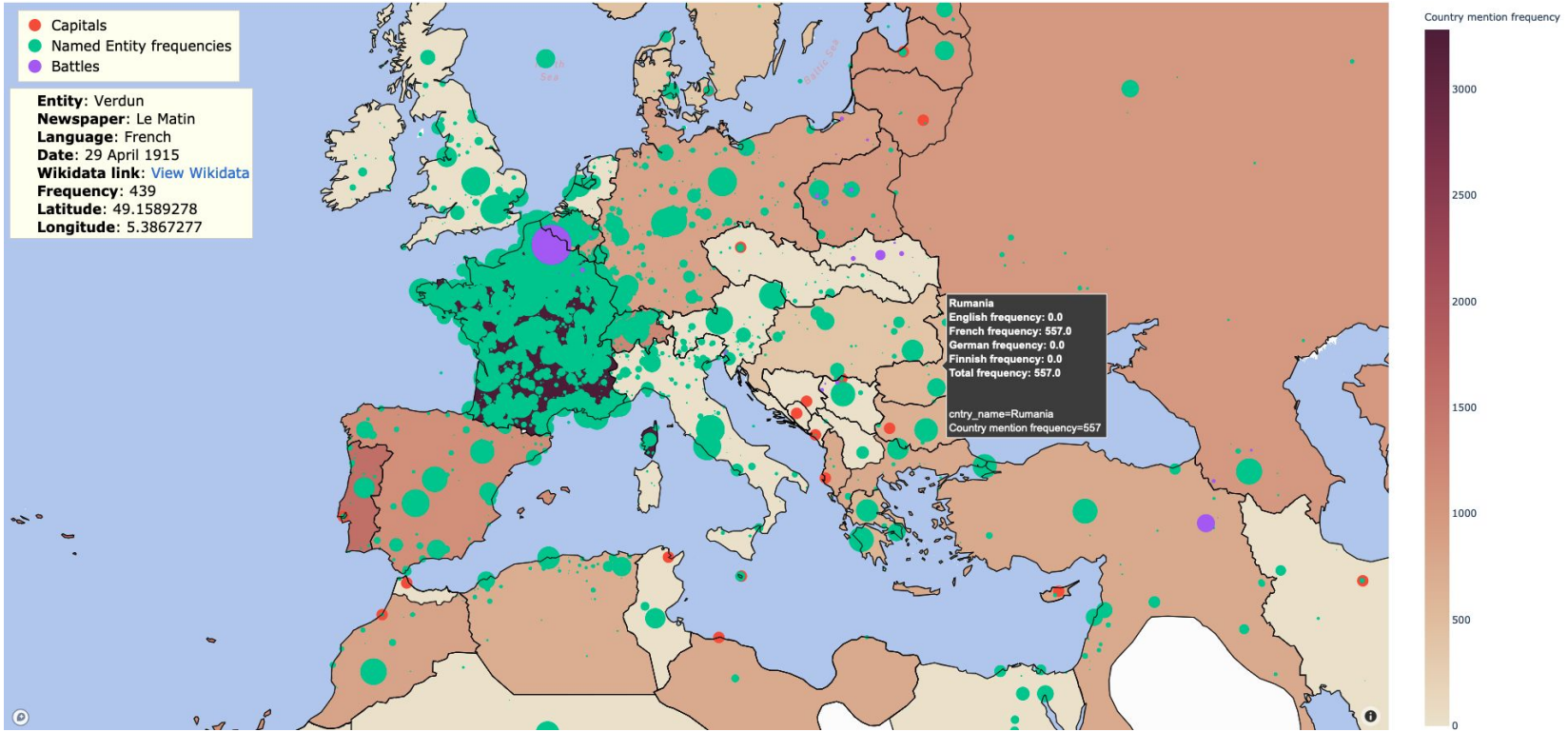
Prototype interface



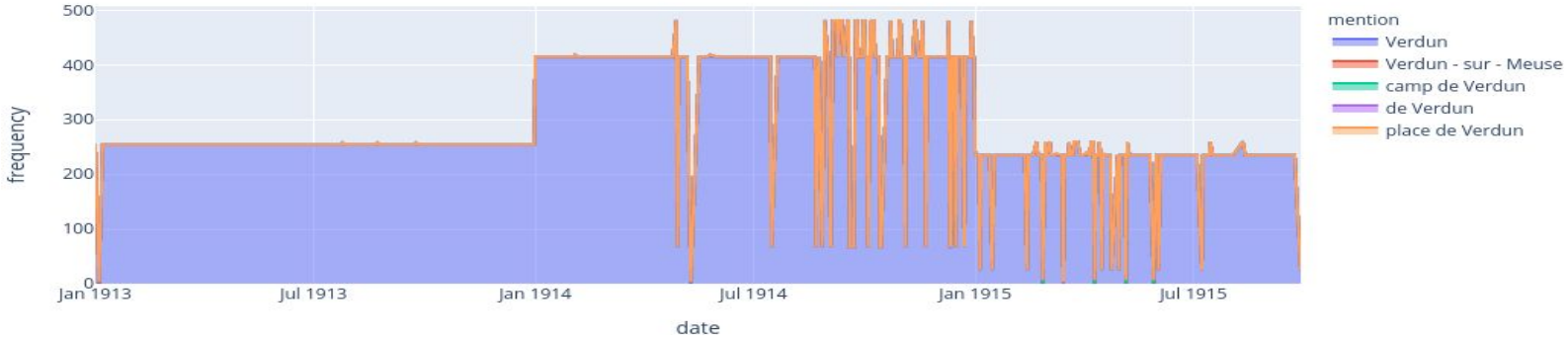
Conclusion and future works

- Pursue the development of the interface, and experiment with several frameworks (Neo4J, Gephi [8], Obsidian, Cosma [9])
- Such interfaces may assist in the creation of personal knowledge of a corpus, and help in the conduction of historical research such as genealogical or prosopographical works
- Considering other visualisation methods than graphs to study entities:
  - heatmap to observe the strength of relations between entities
  - map to visualise the spatial relation between entities [10]
  - timeline showing the important events in which an entity was involved [11]

Conclusion and future works



Conclusion and future works



Occurrences

index	window_left_context	mention	window_right_context	article_link
0	pu être prise pour la	place de Verdun	, en raison de sa	View Article
1	forteresse d'Ossowiez, telle notre grande	place de Verdun	, peut braver tous les	View Article
2	notre troisième armée et la	place de Verdun	. Violemment contre-attaqués, ils ne	View Article
3	ves de la	place de Verdun	. En avant de cet	View Article
4		Verdun	;	View Article
5		Verdun	était intact et l'armée française	View Article
6	matériels bombardé la région de	Verdun	. Deux attade l'ennemi et	View Article
7	Des contre-attaques Vaux, près de	Verdun	. Le sous-marin alle. Biez	View Article
8	et dans la région de	Verdun	. La Grande-Bretagne proclame son	View Article

First Prev 1 2 3 4 5 Next Last

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Thank you for your attention !

Exploring Archives through Entities and Relations

Macroscope Tools for Global Challenges
20/09/2024

Nicolas Gutehrlé: nicolas.gutehrle@univ-fcomte.fr
Iana Atanassova : iana.atanassova@univ-fcomte.fr

C.R.I.T. UR3224 — IUF institut universitaire de France — UNIVERSITÉ DE FRANCHE-COMTÉ

Mapping the Development and Structure of Science

By Yunwei Chen, Chinese Academy of Science, China

Yunwei Chen is a Professor and Specially Appointed Researcher (Backbone) and PhD Supervisor, Chinese Academy of Sciences; Director of the Innovation Research Department, Director of the Scientometrics & Evaluation Research Center (SERC), National Science Library (Chengdu), CAS; Editor-in-chief of the Journal World SCI-TECH R&D; One of the Founders of the Chengdu Conference on Scientometrics and Evaluation; and Vice Chairman, Specialized Committee on Scientometrics and Informetrics, the Chinese Association of Science of Science and S&T Policy Research. He won the 2023 Qiu Junping Award for Excellence in Scientometrics and the Outstanding Contribution Award and Outstanding Young Scientometrician Award.

Mapping the Development and Structure of Science

Application of Scientific Communities Detection within Academic Mixed-Network

CHEN Yunwei

SERC
Scientometrics & Evaluation Research Center
科技创新评价研究中心

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2024.09.20

Outline

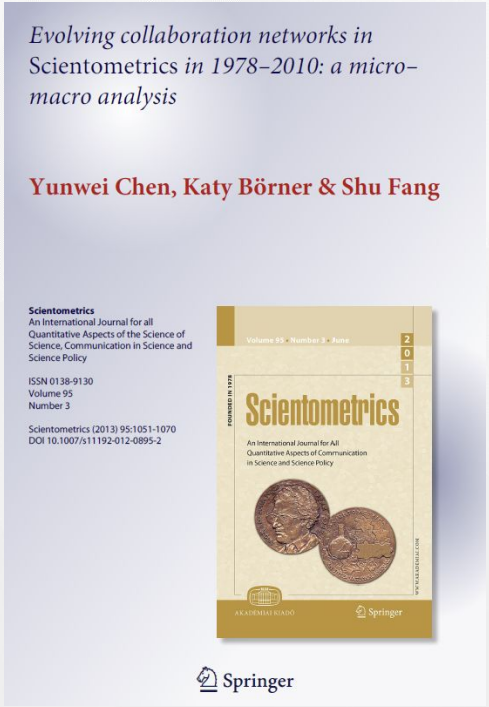
1. **Origin**
2. **Two attempts In Academic Mixed Networks-Theories**

   2.1 Community detection in single-node and multi-relation hybrid networks

   2.2 Community research of multi-node-multi-relation hybrid networks
3. **Future studies**
4. **Brief introduction of my team-SERC**

63

1. Origin



This paper was to understand if and how collaborations at the author (micro) level impact collaboration patterns among institutions (meso) and countries (macro).

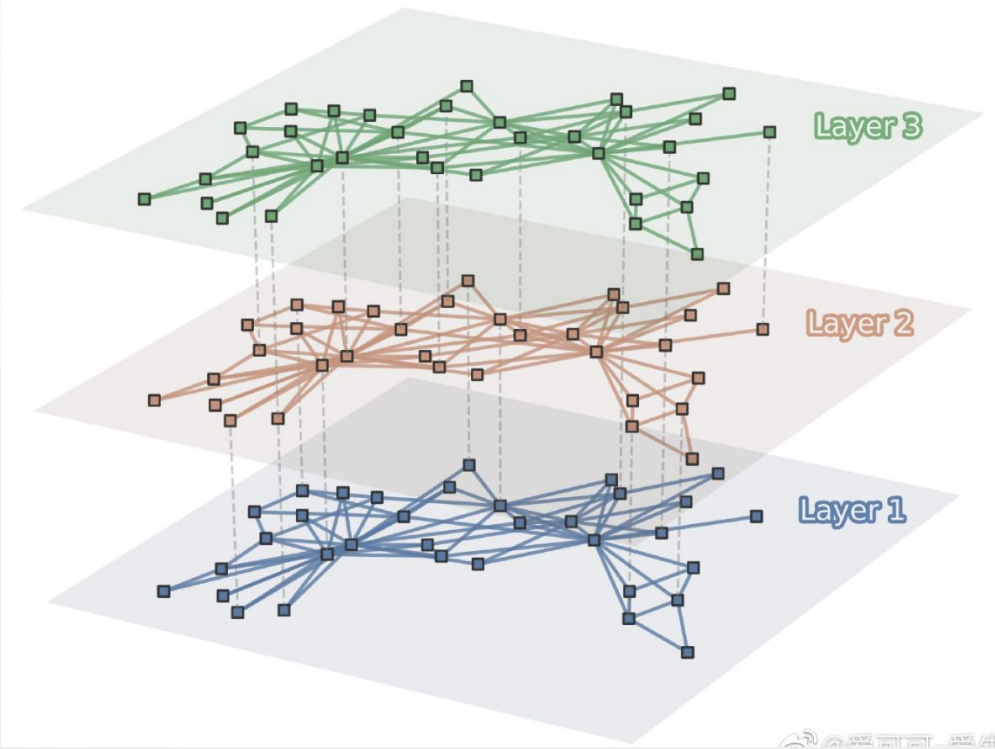
Discussion with Katy in 2009, "*Is it possible to reveal networks of different scales and analyze the interactions between them?*"

The answer to this article is not very strong.

CHEN Yunwei, BÖRNER Katy, FANG Shu. Evolving collaboration networks in scientometrics in 1978-2010: a micro-macro analysis. Scientometrics, 2013, 95(3):1051-1070.

64

1. Origin



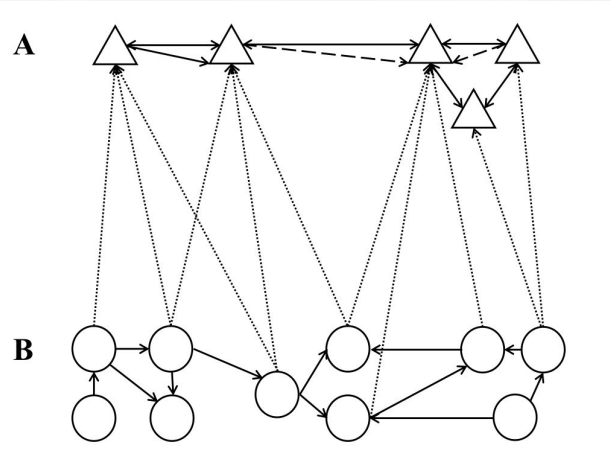
Option 1	Option 2	Option 3,4,…
Co-authors	Co-words	
Co-institutions	Publication-citations	
Co-countries.	Co-authors.	

What we want to do is bring these different networks together for observation and analysis.

65

2. Two attempts In Academic Mixed Networks-Theories

- The term “hybrid network” (heterogeneous networks) in this study encompasses any network that integrates multiple node or relationship types. This means that such a network may contain nodes or edges of two or more types, such as authors and papers, and relationships like collaboration, citation, or topic similarity.



Three types of "hybrid network

- Single-node and multi-relationship heterogeneous network (hereinafter referred to as "single node multi relationship network"), such as a network with the author as a single node, which includes both cooperative and referential relationships.
- Multi-node and multi-relation hybrid networks.
- Multi-node and single-relationship heterogeneous network.

66

Community detection algorithm for mixed network

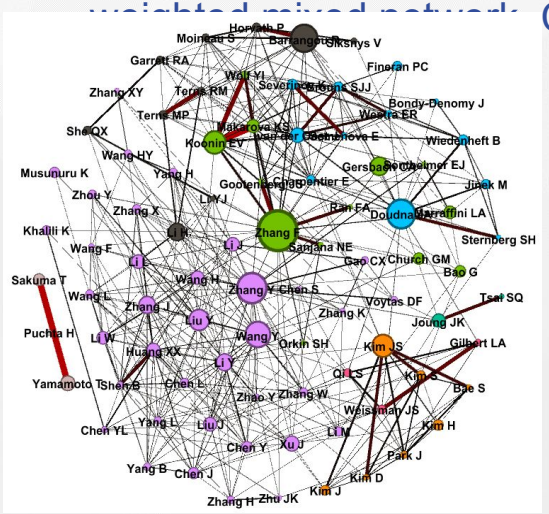
- There is a big challenge of directly applying traditional community detection methods to hybrid networks. Current research on community partitioning methods for multi node and multi relationship networks mainly focuses on the following two types:
  - ✔ one is to extend existing algorithms to directly handle hybrid networks,
  - ✔ and the other is to reduce the dimensions of hybrid networks to isomorphic networks.

- There are mainly six types of community partitioning methods for multi-node and multi-relationship networks.
  - ✔ Ranking based Algorithms, (Sun Yizhou et al., 2019)
  - ✔ Statistic based Algorithms, (Chen Yi, 2016)
  - ✔ Meta-path sampling based Algorithms, (Xue Weijia, 2020)
  - ✔ Seed Centered Algorithms, (Hmimida, Kanawati, 2015)
  - ✔ Extended Modularity Algorithms, (Yakoubi and Kanawati, 2014; Tang et al., 2009; Nicosia et al., 2009)
  - ✔ Heterogeneous Graph Neural Network Algorithms, (Wang et al., 2019)

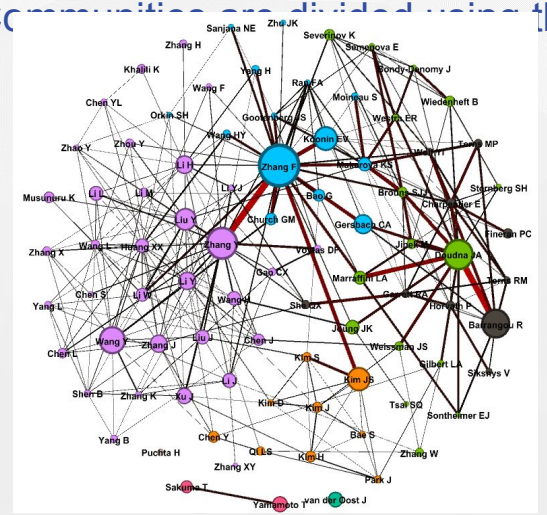
67

2.1 Community detection in single-node and multi-relation hybrid networks

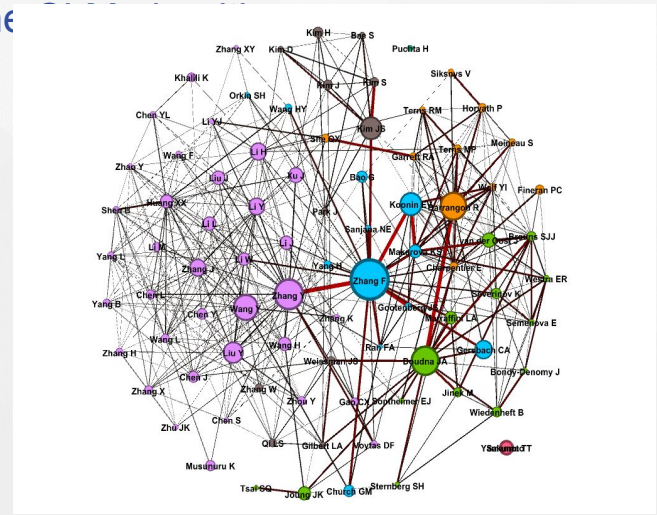
- In single-node and multi-relation hybrid networks, the meaning of network edges can be enriched by various relationships between nodes before clustering or community detection is carried out（*Chen Y, 2016*）.
- In this study, an empirical study on literature data in the CRISPR field is conducted using Similarity weighting method for mixing cooperation and citation relationships as an undirected weighted mixed network. Communities are divided using the



Core authors collaboration network



Core authors citation network



Core authors collaboration and mutual citation data hybrid weighted network

68

2.2 Community research of multi-node-multi-relation hybrid networks

- We construct an academic hybrid network that includes relationships between two distinct types of nodes, authors and papers, with the relationships among nodes covering aspects like author-paper writing relationship, paper citation relationship.
- Edge weights between nodes were calculate based on meta-path. Meta-paths for the two node types, A and B, are identified, including paths such as A-A, A-B-B-A, B-B, among others, as de

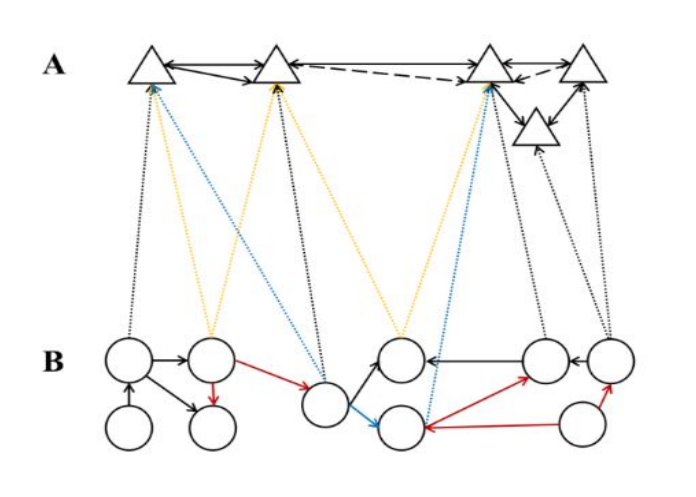


Figure: Example of meta-path extraction

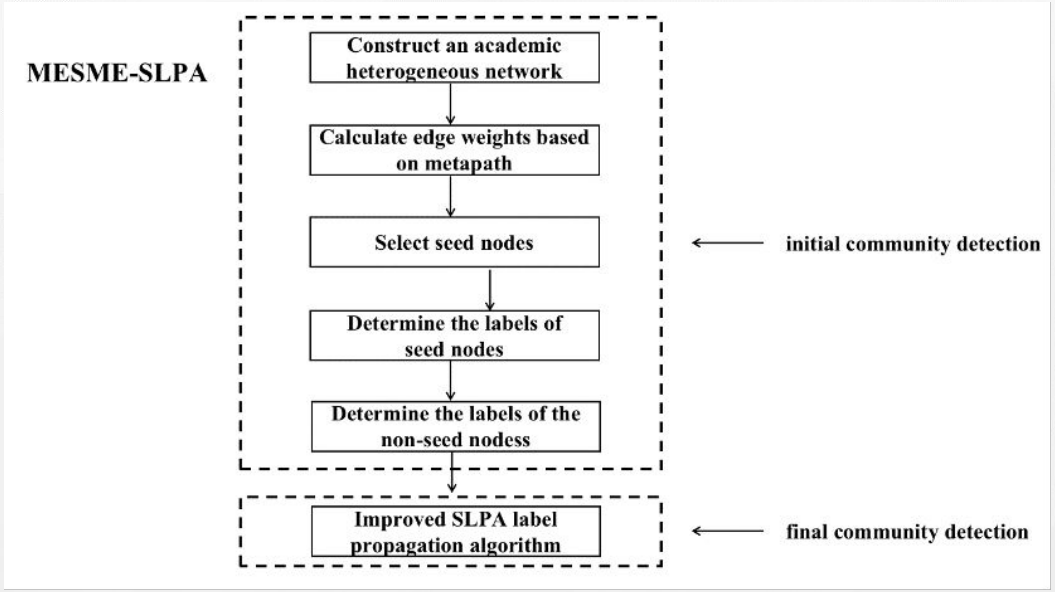
Table: Meta-path selection and meaning

Meta-path	Relationship Meaning
P⟶A	author-paper working
Pi⟶Pj	paper citation
P⟶C	paper-journal publication
K⟶P	keyword-paper containing
Ai⟵P⟶Aj	co-authorship
Ai⟵Pi⟶Pj⟶Aj	author citation

69

2.2 Community research of multi-node-multi-relation hybrid networks

- A method for detecting overlapping communities, named MESME-SLPA (*Meta-path Extraction, Seednodes and Modularity Extension - SLPA Community Detection Method*), which utilizes meta-path extraction, seed nodes, and an enhanced modularity approach, with the improved SLPA algorithm being pivotal for identifying overlapping communities.
- The methodology unfolds as in the figure on right.



70

2.2 Community research of multi-node-multi-relation hybrid networks

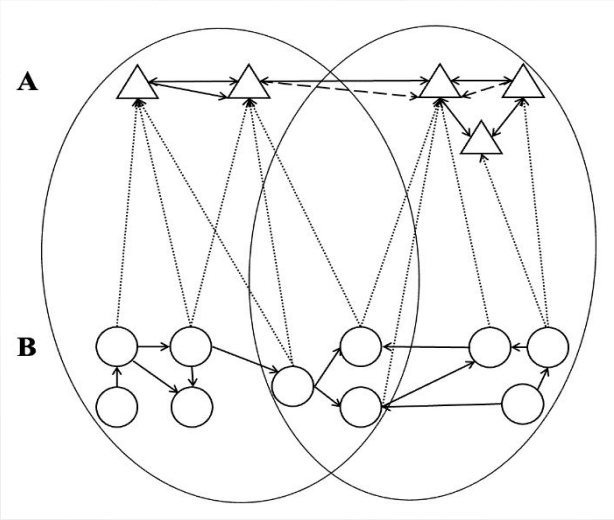


Figure: Example of overlapping communities

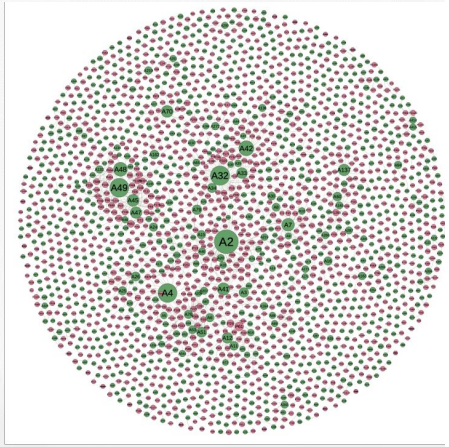
- As depicted in Figure on left, following the execution of the previously outlined steps, all nodes are eventually categorized into two distinct yet overlapping communities. Notably, three central nodes from category B serve as overlapping nodes, indicating their membership in both communities, thereby marking the completion of the community detection process.
- To assess the method's effectiveness and practicality, the study utilized the DBLP dataset for validation. It compared the proposed method against established hybrid network community detection approaches, including Hete-LPA, Hete_MESC (Zhang, 2017), and HCD_all (Shi & Yu, 2017).

Table: Comparison of experimental results of different community classification methods

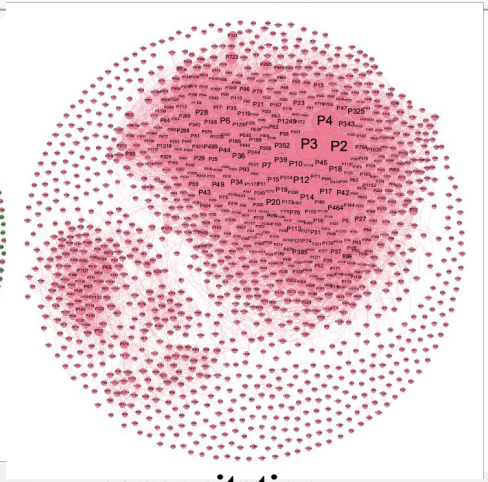
Method	NMI	Q
Hete-LPA	0.5799	0.4997
HCD_all	0.6797	0.5412
Hete_MESC	0.7363	0.5492
MESME-SLPA	0.8125	0.5734

71

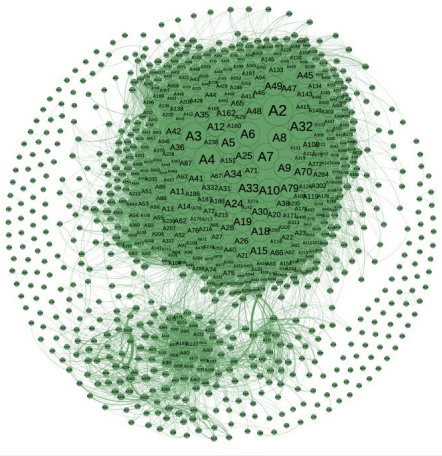
2.2 Community research of multi-node-multi-relation hybrid networks



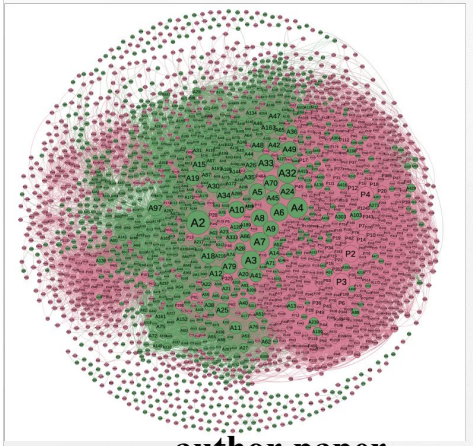
author-paper netwok



paper citation network



author heterogeneous network



author-paper heterogeneous network

Network	Average degree	Network diameter	Network density	Average path length	Connectivity
author-paper netwok	2.161	21	0.001	8.287	0
paper citation network	2.587	11	0.003	4.276	0.715
author heterogeneous network	38.813	8	0.044	2.578	0.708
author-paper heterogeneous network	30.229	10	0.014	3.261	0.451

2.2 Community research of multi-node-multi-relation hybrid networks

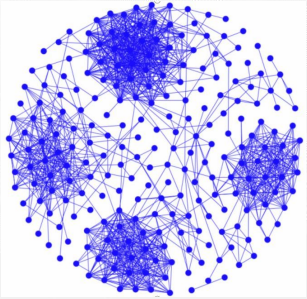
- The findings from the experiment indicate that the MESME-SLPA approach developed in this research outperforms other methods in terms of both NMI (Normalized Mutual Information) and Q value, demonstrating a superior community detection outcome. This highlights the method's effectiveness.
- By integrating relationships from multiple perspectives and utilizing the network structure and rich link semantics between multiple types of nodes in the network, it conducts overlapping community detection. On the one hand, it can clearly reveal the academic community and its intrinsic construction mechanisms, refine research directions. On the other hand, the detection of overlapping communities can, to a certain extent, understand the research direction trajectories of researchers, more accurately discover the frontier research hotspots in the field, and contribute to broadening the breadth and depth of domain research.

Jiang, Lu, Chen, Yunwei, Jorge, Gulín-González. A new method for Community Detection in Academic Heterogeneous Networks. Proceedings of ISSI 2023. 2 July -5 July, 2023, Bloomington, USA. - 19TH INTERNATIONAL CONFERENCE ON SCIENTOMETRICS & INFORMETRICS, 2023, No.161

73

Future studies

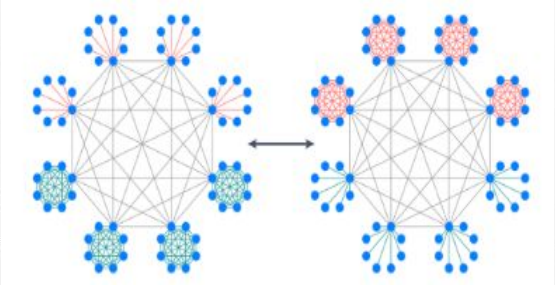
- **From static analysis to dynamic analysis and description, from structural discovery to understanding of evolutionary laws.**

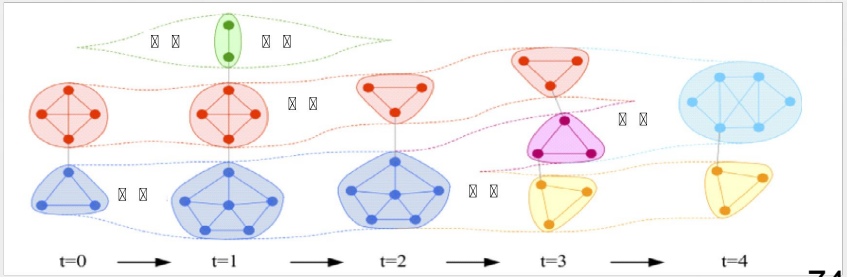


Static hybrid network → Dynamic hybrid networking

↓ ↓

Structural discovery → Evolutionary laws





74

Brief introduction of my team-SERC

SERC

Scientometrics & Evaluation Research Center

科技创新评价研究中心

75

Vision

We will build a Scientometrics and Evaluation Research Center, to be well-known nationally, and with close research cooperation with related important institutes overseas.

Mission

To support policy-making of government, the SERC focus on:

- **Quantitative analysis of science-technology development**
- **Research on science of science**
- **Analysis of institutes/groups' research impact**

Who we are

- **An open research center / SERC.**
- **Following new-type paradigm based on data and computation.**
  -Professional, Computational, Methodological, Strategical,
  -made our work useful for informed Policy-making.
- **Carrying out research of evaluative scientometrics.**
  Mainly focusing on the new scientometrics methods related to scientific big data, paying special attention to the third-party evaluation.

76

Research Interests

77

A case: Enhancing Direct Citations: A Comparison of Relatedness Measures for Community Detection in a Large Set of PubMed Publications

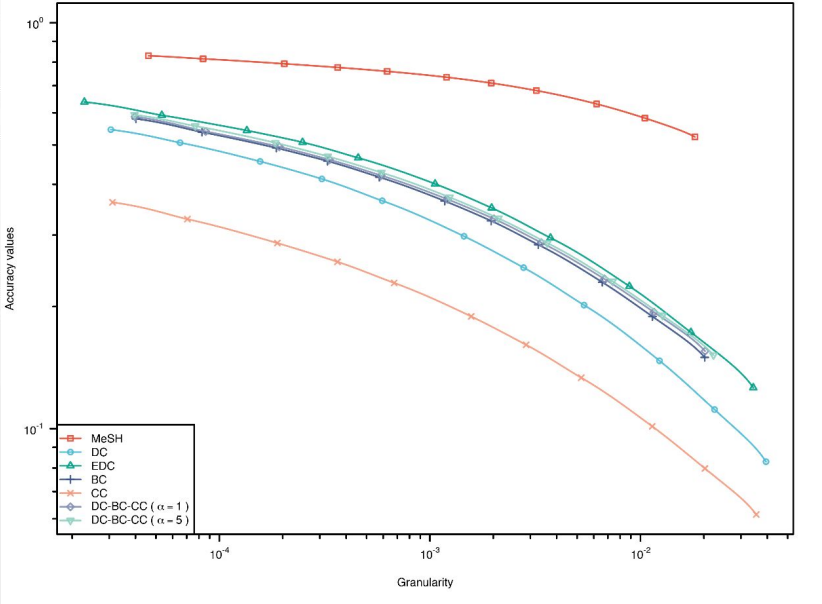


Figure. GA plot for comparing the approaches DC, EDC, BC, CC and the two variants of DC-BC-CC. MeSH used as the evaluation criterion.

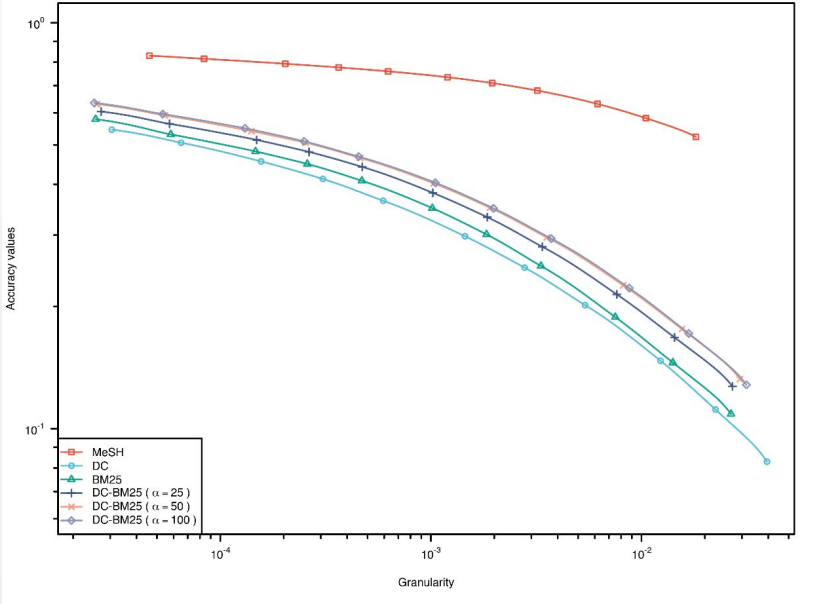
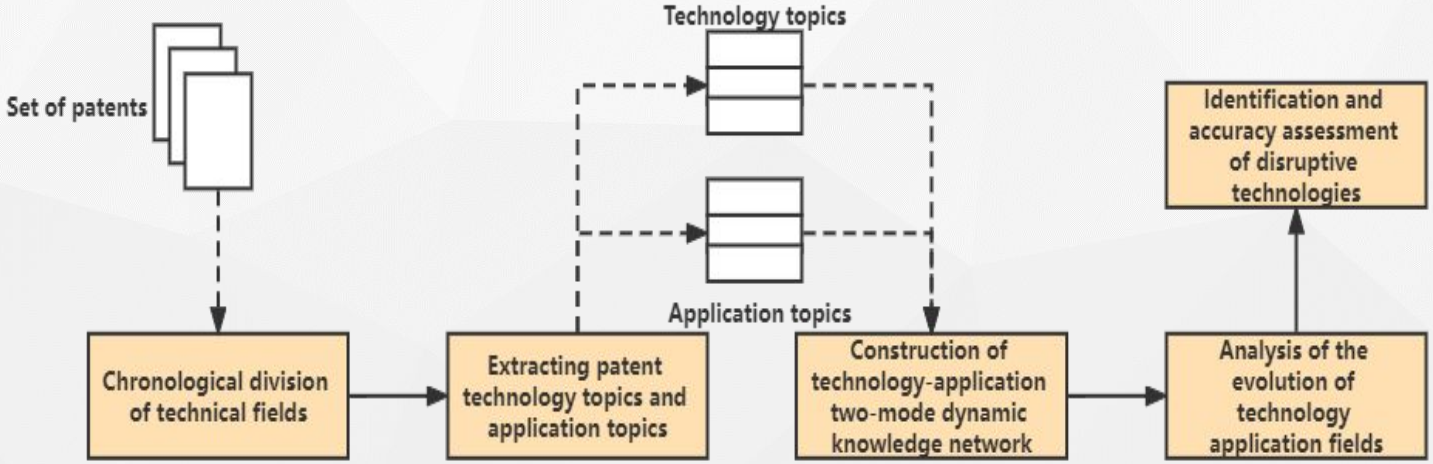


Figure 2. GA plot for comparing the approaches DC, BM25 and the three variants of DC-BM25. MeSH used as the evaluation criterion

Authors: Per Ahlgren, Yunwei Chen, Cristian Colliander and Nees Jan van Eck

78

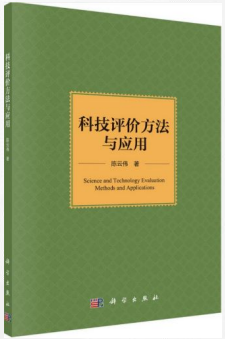
A case: A new method of disruptive technology identification based on technology-application evolution analysis



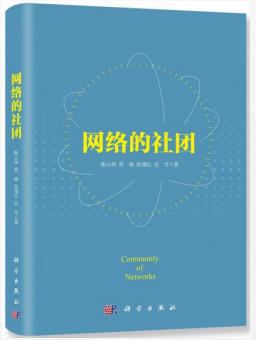
Zhang, Xuyi, Chen, Yunwei, Jorge, Gulín-González. A new method of disruptive technology identification based on technology-application evolution analysis. Proceedings of ISSI 2023. 2 July -5 July, 2023, Bloomington, USA. - 19TH INTERNATIONAL CONFERENCE ON SCIENTOMETRICS & INFORMETRICS, 2023, No.157

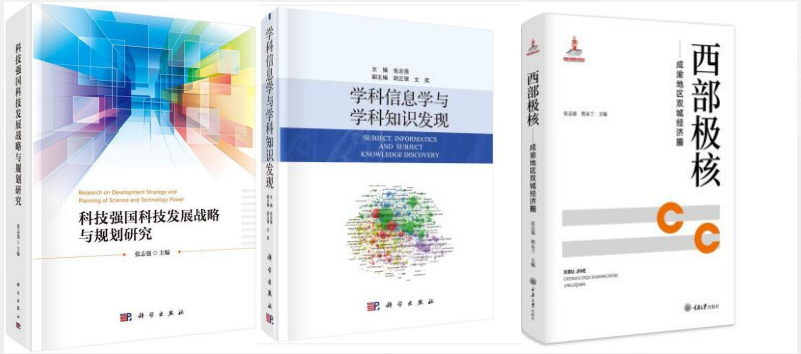
79


SERC
Sci-tech Innovation Evaluation Research Center
报告发布
2023年9月15日
科技创新中心科技创新力指数
中国科学院成都文献情报中心
科技创新评价研究中心
2023年9月
第六届
科学计量与科技评价
天府论坛


科技评价方法与应用
Science and Technology Evaluation Methods and Applications

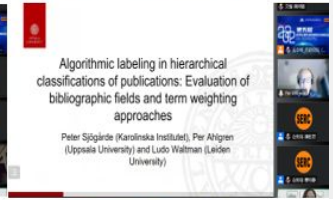

社会网络分析在情报分析中的应用


网络的社团
Community of Networks


科技强国科技发展战略与规划研究
学科信息学与学科知识发现
SUBJECT INFORMATICS AND SUBJECT KNOWLEDGE DISCOVERY
西部极核
成渝地区双城经济圈

80

5th Chengdu Conference on Scientometrics & Evaluation



人民日报
中国网
四川卫视
中新网
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央广网
腾讯新闻

81

6th Chengdu Conference on Scientometrics & Evaluation

82

My Hosting Conference

7th Chengdu Conference on Scientometrics & Evaluation
（Chengdu, China. Dec. 4-6 2024）

83

中国科学院成都文献情报中心
CHENGDU LIBRARY AND INFORMATION CENTER, CHINESE ACADEMY OF SCIENCES

SERC
Scientometrics & Evaluation Research Center
科技创新评价研究中心

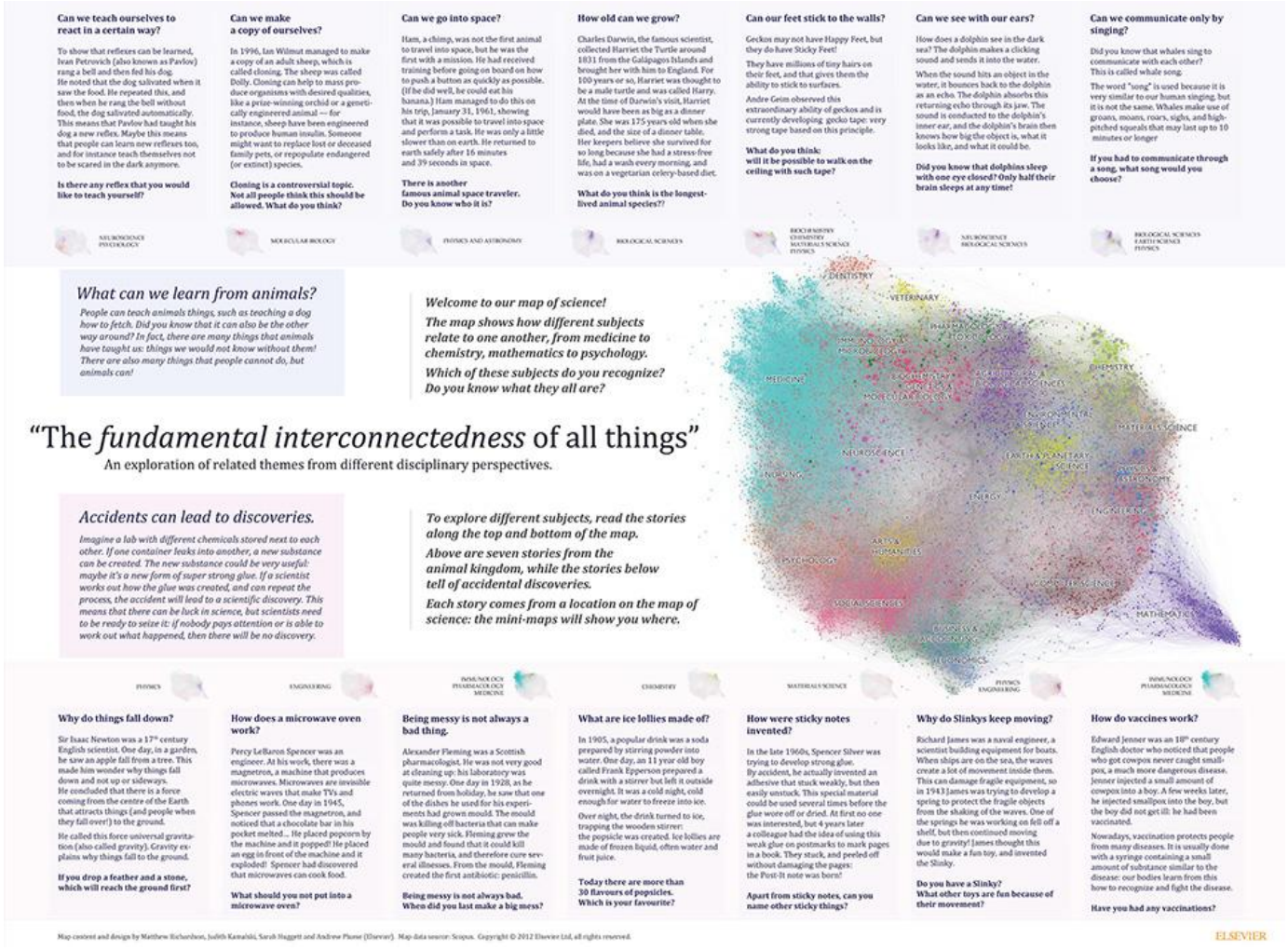
THANKS

chenyw@clas.ac.cn

Science Maps for Kids: The Fundamental Interconnectedness of All Things

By Sarah Huggett, Elsevier, UK

Sarah Huggett is Vice-President, Global Research Solutions at Elsevier, based in London. In this role, she leads a global team partnering with government agencies, funding bodies, and academic institutions to help them realise their open science ambitions. In her previous role as Head of Analytical Services for Asia-Pacific at Elsevier, she led a team analysing research performance to offer recommendations to research leaders planning for the future. Previously, she worked in Elsevier's Research & Academic Relations team in Oxford, UK, turning data into insights to inform strategic planning. She has a particular interest in new developments in open science and research evaluation, as well as a passion for Inclusion & Diversity. After completing a Bachelor's then Master's degrees at the University of Grenoble, France, Sarah moved to the UK to teach French at the University of Oxford, prior to joining Elsevier in 2006. Throughout her career at Elsevier, she has actively participated in the Elsevier Women Network (recently rebranded as the THRIVE Employee Resource Group), leading the Singapore chapter from 2018 to 2023. Outside of work, Sarah enjoys family time with her husband and five children, currently ranging from age 1 to 13.


Can we teach ourselves to react in a certain way?
To show that reflexes can be learned, Ivan Petrovich (also known as Pavlov) rang a bell and then fed his dog. He noted that the dog salivated when it saw the food. He repeated this, and then when he rang the bell without food, the dog salivated automatically. This means that Pavlov had taught his dog a new reflex. Maybe this means that people can learn new reflexes too, and for instance teach themselves not to be scared in the dark anymore.
Is there any reflex that you would like to teach yourself?
NEUROSCIENCE PSYCHOLOGY
Can we make a copy of ourselves?
In 1996, Ian Wilmut managed to make a copy of an adult sheep, which is called cloning. The sheep was called Dolly. Cloning can help to mass produce organisms with desired qualities, like a prize-winning orchid or a genetically engineered animal — for instance, sheep have been engineered to produce human insulin. Someone might want to replace lost or deceased family pets, or repopulate endangered (or extinct) species.
Cloning is a controversial topic. Not all people think this should be allowed. What do you think?
MOLECULAR BIOLOGY
Can we go into space?
Ham, a chimp, was not the first animal to travel into space, but he was the first with a mission. He had received training before going on board on how to push a button as quickly as possible. (If he did well, he could eat his banana.) Ham managed to do this on his trip, January 31, 1961, showing that it was possible to travel into space and perform a task. He was only a little slower than on earth. He returned to earth safely after 16 minutes and 39 seconds in space.
There is another famous animal space traveler. Do you know who it is?
PHYSICS AND ASTRONOMY
How old can we grow?
Charles Darwin, the famous scientist, collected Harriet the Turtle around 1831 from the Galápagos Islands and brought her with him to England. For 100 years or so, Harriet was thought to be a male turtle and was called Harry. At the time of Darwin's visit, Harriet would have been as big as a dinner plate. She was 175 years old when she died, and the size of a dinner table. Her keepers believe she survived for so long because she had a stress-free life, had a wash every morning, and was on a vegetarian celery-based diet.
What do you think is the longest-lived animal species??
BIOLOGICAL SCIENCES
Can our feet stick to the walls?
Geckos may not have Happy Feet, but they do have Sticky Feet!
They have millions of tiny hairs on their feet, and that gives them the ability to stick to surfaces.
Andre Geim observed this extraordinary ability of geckos and is currently developing gecko tape: very strong tape based on this principle.
What do you think: will it be possible to walk on the ceiling with such tape?
BIOCHEMISTRY CHEMISTRY MATERIALS SCIENCE PHYSICS
Can we see with our ears?
How does a dolphin see in the dark sea? The dolphin makes a clicking sound and sends it into the water.
When the sound hits an object in the water, it bounces back to the dolphin as an echo. The dolphin absorbs this returning echo through its jaw. The sound is conducted to the dolphin's inner ear, and the dolphin's brain then knows how big the object is, what it looks like, and what it could be.
Did you know that dolphins sleep with one eye closed? Only half their brain sleeps at any time!
NEUROSCIENCE BIOLOGICAL SCIENCES
Can we communicate only by singing?
Did you know that whales sing to communicate with each other? This is called whale song.
The word "song" is used because it is very similar to our human singing, but it is not the same. Whales make use of groans, moans, roars, sighs, and high-pitched squeals that may last up to 10 minutes or longer
If you had to communicate through a song, what song would you choose?
BIOLOGICAL SCIENCES EARTH SCIENCE PHYSICS
What can we learn from animals?
People can teach animals things, such as teaching a dog how to fetch. Did you know that it can also be the other way around? In fact, there are many things that animals have taught us: things we would not know without them! There are also many things that people cannot do, but animals can!
Welcome to our map of science!
The map shows how different subjects relate to one another, from medicine to chemistry, mathematics to psychology.
Which of these subjects do you recognize? Do you know what they all are?
"The fundamental interconnectedness of all things"
An exploration of related themes from different disciplinary perspectives.
DENTISTRY
VETERINARY
MEDICINE
CHEMISTRY
NEUROSCIENCE
MATERIALS SCIENCE
ENERGY
ENGINEERING
ARTS & HUMANITIES
PSYCHOLOGY
SOCIAL SCIENCES
MATHEMATICS
Accidents can lead to discoveries.
Imagine a lab with different chemicals stored next to each other. If one container leaks into another, a new substance can be created. The new substance could be very useful: maybe it's a new form of super strong glue. If a scientist works out how the glue was created, and can repeat the process, the accident will lead to a scientific discovery. This means that there can be luck in science, but scientists need to be ready to seize it: if nobody pays attention or is able to work out what happened, then there will be no discovery.
To explore different subjects, read the stories along the top and bottom of the map.
Above are seven stories from the animal kingdom, while the stories below tell of accidental discoveries.
Each story comes from a location on the map of science: the mini-maps will show you where.
PHYSICS
ENGINEERING
IMMUNOLOGY PHARMACOLOGY MEDICINE
CHEMISTRY
MATERIALS SCIENCE
PHYSICS ENGINEERING
IMMUNOLOGY PHARMACOLOGY MEDICINE
Why do things fall down?
Sir Isaac Newton was a 17th century English scientist. One day, in a garden, he saw an apple fall from a tree. This made him wonder why things fall down and not up or sideways. He concluded that there is a force coming from the centre of the Earth that attracts things (and people when they fall over!) to the ground.
He called this force universal gravitation (also called gravity). Gravity explains why things fall to the ground.
If you drop a feather and a stone, which will reach the ground first?
How does a microwave oven work?
Percy LeBaron Spencer was an engineer. At his work, there was a magnetron, a machine that produces microwaves. Microwaves are invisible electric waves that make TVs and phones work. One day in 1945, Spencer passed the magnetron, and noticed that a chocolate bar in his pocket melted... He placed popcorn by the machine and it popped! He placed an egg in front of the machine and it exploded! Spencer had discovered that microwaves can cook food.
What should you not put into a microwave oven?
Being messy is not always a bad thing.
Alexander Fleming was a Scottish pharmacologist. He was not very good at cleaning up: his laboratory was quite messy. One day in 1928, as he returned from holiday, he saw that one of the dishes he used for his experiments had grown mould. The mould was killing off bacteria that can make people very sick. Fleming grew the mould and found that it could kill many bacteria, and therefore cure several illnesses. From the mould, Fleming created the first antibiotic: penicillin.
Being messy is not always bad. When did you last make a big mess?
What are ice lollies made of?
In 1905, a popular drink was a soda prepared by stirring powder into water. One day, an 11 year old boy called Frank Epperson prepared a drink with a stirrer but left it outside overnight. It was a cold night, cold enough for water to freeze into ice.
Over night, the drink turned to ice, trapping the wooden stirrer: the popsicle was created. Ice lollies are made of frozen liquid, often water and fruit juice.
Today there are more than 30 flavours of popsicles. Which is your favourite?
How were sticky notes invented?
In the late 1960s, Spencer Silver was trying to develop strong glue. By accident, he actually invented an adhesive that stuck weakly, but then easily unstuck. This special material could be used several times before the glue wore off or dried. At first no one was interested, but 4 years later a colleague had the idea of using this weak glue on postmarks to mark pages in a book. They stuck, and peeled off without damaging the pages: the Post-It note was born!
Apart from sticky notes, can you name other sticky things?
Why do Slinkys keep moving?
Richard James was a naval engineer, a scientist building equipment for boats. When ships are on the sea, the waves create a lot of movement inside them. This can damage fragile equipment, so in 1943 James was trying to develop a spring to protect the fragile objects from the shaking of the waves. One of the springs he was working on fell off a shelf, but then continued moving due to gravity! James thought this would make a fun toy, and invented the Slinky.
Do you have a Slinky? What other toys are fun because of their movement?
How do vaccines work?
Edward Jenner was an 18th century English doctor who noticed that people who got cowpox never caught smallpox, a much more dangerous disease. Jenner injected a small amount of cowpox into a boy. A few weeks later, he injected smallpox into the boy, but the boy did not get ill: he had been vaccinated.
Nowadays, vaccination protects people from many diseases. It is usually done with a syringe containing a small amount of substance similar to the disease: our bodies learn from this how to recognize and fight the disease.
Have you had any vaccinations?
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ELSEVIER

Observations

By Andrea Scharnhorst, DANS & KNAW, The Netherlands

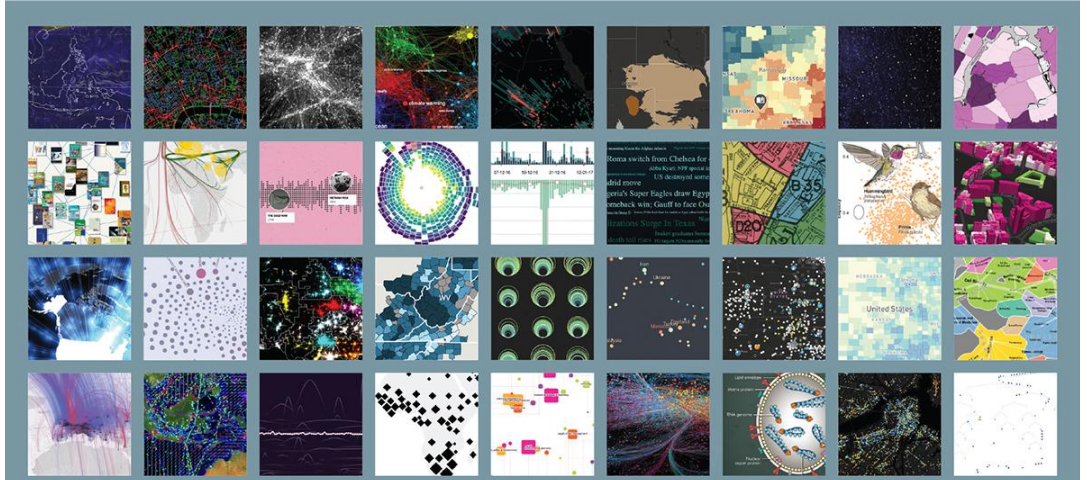
Andrea Scharnhorst is a senior policy advisor at DANS. In her academic career she moved from statistical physics, to philosophy of science, scientometrics and information sciences. She has published on models of innovation and science dynamics, the Matthew effect in science, the evolution of classification systems, the use of digital research archives, visual interfaces for information navigation, and the application of linked data in the humanities. Often her work entails the transfer of concepts and methods at an interface between physics and social sciences and humanities. Dr. Scharnhorst coordinated and participated in several EU- and national funded projects. She co-lead a graduation programme in Digital Humanities, chaired the COST Action TD1210 "Knowescape" on information visualization. Currently, she works also for the European Research Infrastructure Consortium DARIAH.

Special and Universal, precision and recall, … whatever name you give this dialectic contradiction - we all experience this as Scylla and Charybdis when dealing with large bodies of information.

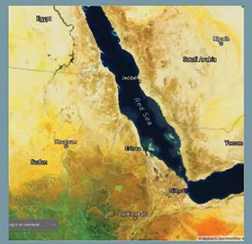
The P&S *enterprise* taught me (us) that information visualisation is not ‘just’ a necessity or tool to navigate this tension but in its aesthetic, artistic dimensions also touches our souls. It creates another level of engagement, awareness and involvement far beyond our minds.

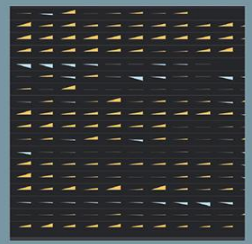
Places and Spaces has created a landmark in professionalizing and democratizing information visualisation, but it is also ‘just’ a beginning, and an open invitation to pursue, to explore, to create, to influence for the greater good, for the challenges we face as mankind.

Q&A



Macroscope Tools for Global Challenges





We would like to thank

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The technical expertise of Haley Scruggs, Nicole Johnson, and the Luddy IT Team for online event support.

Today’s speakers, for sharing their work in the spirit of the exhibit, as they continue to experiment with innovative ways to visualize information.

Tours

Curated Exhibit Tours
Open Discussion
Light Refreshments