



Ministry of Science
and Higher Education

Republic of Poland

Visualization for science policy makers

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www.nauka.gov.pl



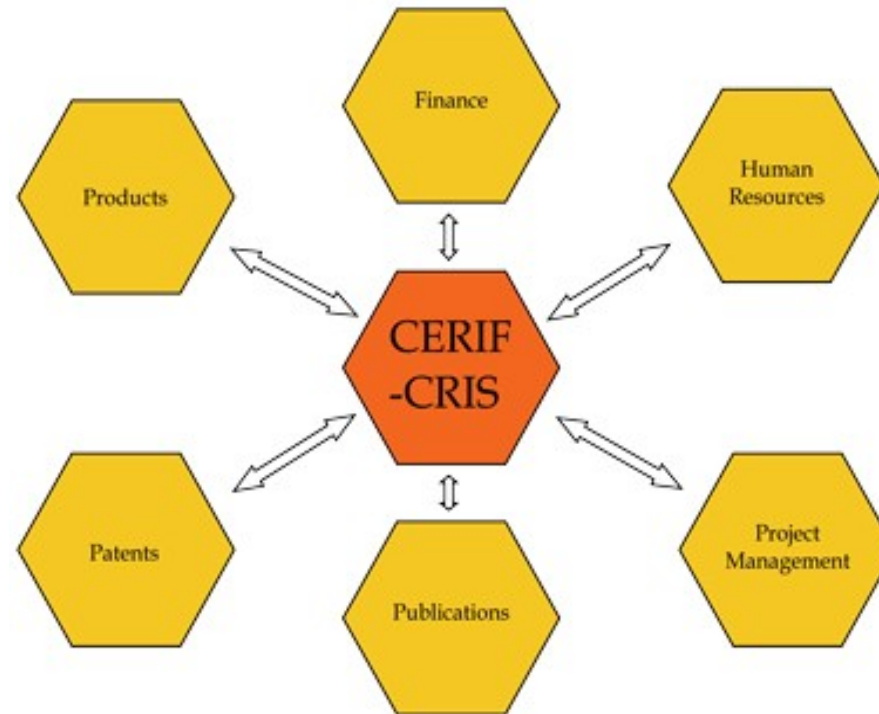
Why visualization?

Science policy makers need to understand the structure of scientific research in their region/country, find strong and weak areas, compare it with other countries, match their research institutions with calls from funding agencies.

- First we need to collect information. Digitize what you can.
- Second, we need analytics/visualization to understand it.

We need visual analytics to compare structure of science in Poland with other countries, find who collaborates with whom, especially in view of our participation in the Horizon 2020 and other international programs.

Current Research Information System



- Mostly deployed on institutional or national level
- Problems: exchange of data between different system, data provisioning for third party services

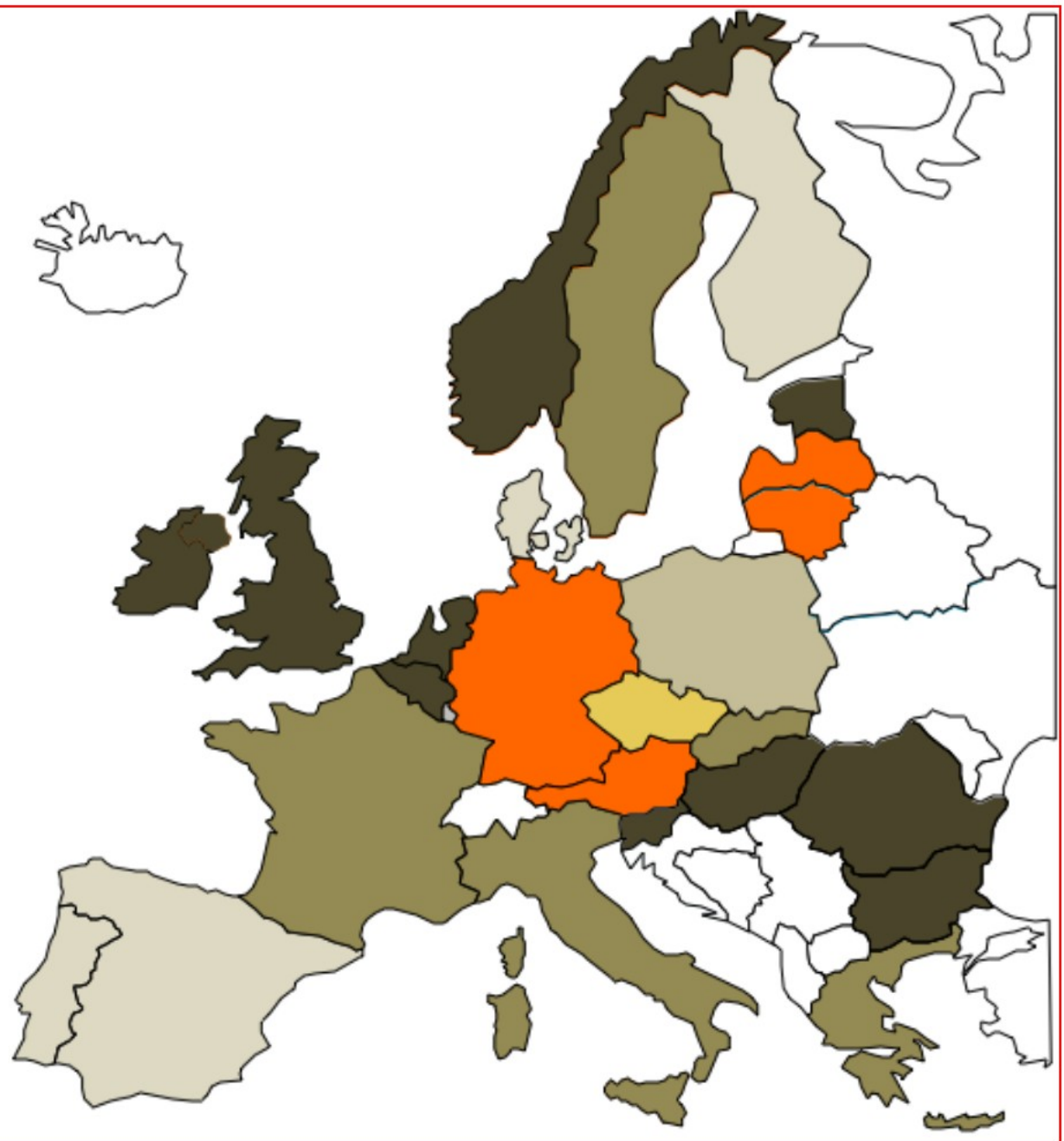
National CRIS –
CERIF compliant

National CRIS
(CERIF compliant)
under construction

National CRIS
(CERIF-compliant)
considered

National CRIS – not
CERIF compliant

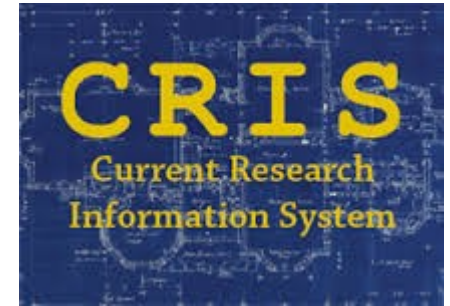
National CRIS is not
considered



CRIS Standards

- CERIF - Common European Research Information Format, developed by euroCRIS consortium.
- EuroCRIS provides the most comprehensive data on OA research output of European researchers, used by the EC.
- Main system hosted at ICM (Uni Warsaw), orphan repository at CERN.
- Developed by 50 partners from all EU countries.
- De-facto standard (>200 institutions), used by the OpenAIRE, The European Open Access Infrastructure for Research.

Our CRIS



OSF system (OPI) collects information about grants, including yearly reports.

[Portal Nauka Polska](#) (Polish Science Portal), run by OPI-PIB, collects information about:

- People with PhD/DSC degrees: affiliations, PhD thesis and supervised students, areas of expertise, publications, grants, completed projects.
- Whole scientific institutions.

Not yet CERIF integrated CRIS system.

Serves decision makers but lacks visualization, analytics, real-time info about grant calls and many other functionalities.



I want to Digitize

Many initiatives towards digitization of almost everything in the world ... net is the place to be (forget libraries ...).

Funds from national budget or EU operational programs: Innovative Economy (POIG), Human Capital, Regional Programs, flowing through different channels.

New operational program „Digital Poland” (POPC, [PO Polska Cyfrowa](#)) has started in 2014 and will end in 2020.

About 8 mld PLN (2 bln €), including digitization of public data, creation of repositories of cultural objects.

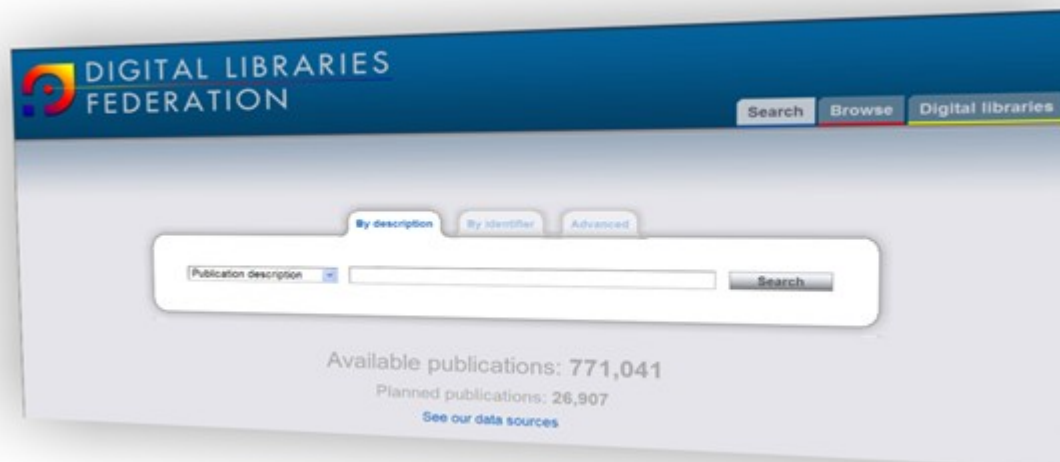
Encouraging Open Science

- Access to scientific literature (journals and books) through national licenses for Springer, Elsevier, Wiley, Nature Publishing and other publishers is granted thanks to Virtual Library Licenses.
- Negotiating national licenses for Open Access publications in major journals, free for scientists, paid by the Ministry.
- Creating our own repositories and digital libraries;
- Creating our own platforms for open access polish journals, supporting only open access journals;
revenue of major English language STM publishers ~9.4 B \$
- Participating in EU projects such as CLARIN, SSH, DARIAH and [FOSTER](#) Facilitate Open Science Training for European Research
[OpenAIRE](#) The European Open Access Infrastructure for Research

Federation of Digital Libraries

- Digitalization and access to the Polish cultural heritage,
- Over 2.5 mln of objects, over 560.000 unique users (mid 2015).
- 126 data sources and 372 institutions contributing,
- one of the top providers of digital content to the “EUROPEANA” – European library of cultural heritage

<http://fbc.pionier.net.pl/owoc>



Repositories in Poland

In the middle of 2014 we had 24 active scientific repositories:

22 – institutional repositories

1 – specializing in history, art, music ... (Lectorium.pl)

1 – Center for Open Science repository.

What kind of institutions create them?

- Universities, national and private (over 700 supported)
- Polish Academy of Science (70 units)
- Consortia of research institutes (116 institutes)
- Scientific Societies

RCIN (<http://rcin.org.pl>) includes professionally prepared current scientific publications of the **Academy of Science and Research Institutes** (over 40 now) including:

- journals,
- XIX & XX century reprints
- incunable
- maps,
- old prints,
- manuscripts,
- photographs,
- multimedia (audio)





Central Repository of Thesis

The Ministry of Science and Higher Education creates a Central Repository of Thesis – diploma, MS c, some PhD.

Each university will be required to verify the originality of its students' thesis before the final exam using an in-house anti-plagiarism program interfacing with the Central Repository of Thesis.

The inclusion of university thesis databases to expand the Central Repository of Theses will facilitate plagiarism detection both by the promoter and by the Polish Accreditation Committee.

The entity responsible for administering the Central Repository of Theses will be the minister responsible for higher education, while the choice of anti-plagiarism software will be up to each university.

Regulations effective from the academic year 2015/2016.

Polish Scholarly Bibliography (PBN)

The Polish Scholarly Bibliography (PBN) is a portal of the MS&HE, collecting information on publications of Polish scientists in Polish and foreign scholarly journals.

It is a part of POLON, the System of Information on Higher Education.

With the Polish Scholarly Bibliography one can:

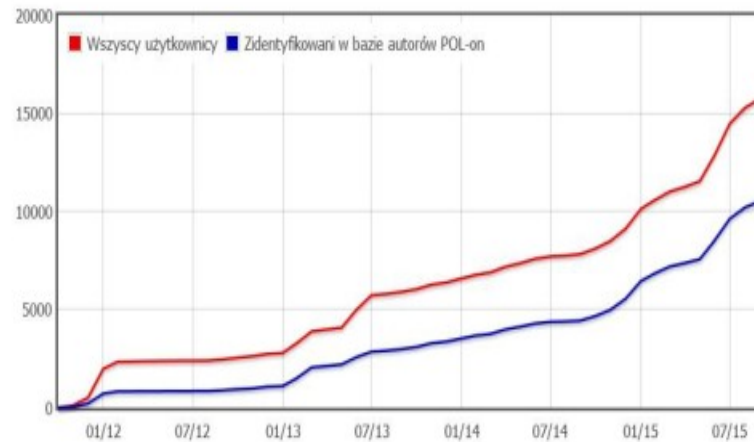
- create a public bibliography of a person or an institution,
- get to know the achievements of Polish scholars and institutions,
- submit a journal questionnaire during an evaluation period,
- enable users to deposit full texts of publications in a central repository.

PBN will also:

- allow users to maintain personal and institutional bibliographies.
- integrate with institutional repositories in Poland.

Polish Scientific Bibliography (PBN)

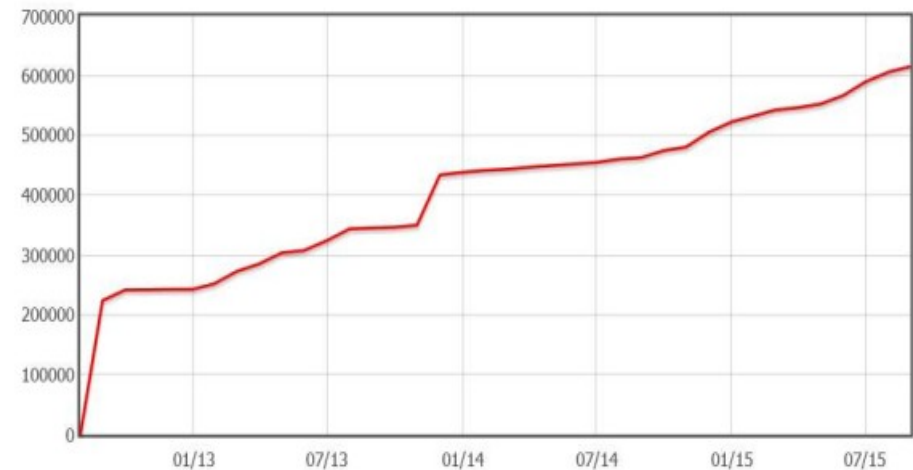
Liczba zarejestrowanych użytkowników



Wzrost liczby użytkowników i autorów zarejestrowanych w bazie PBN

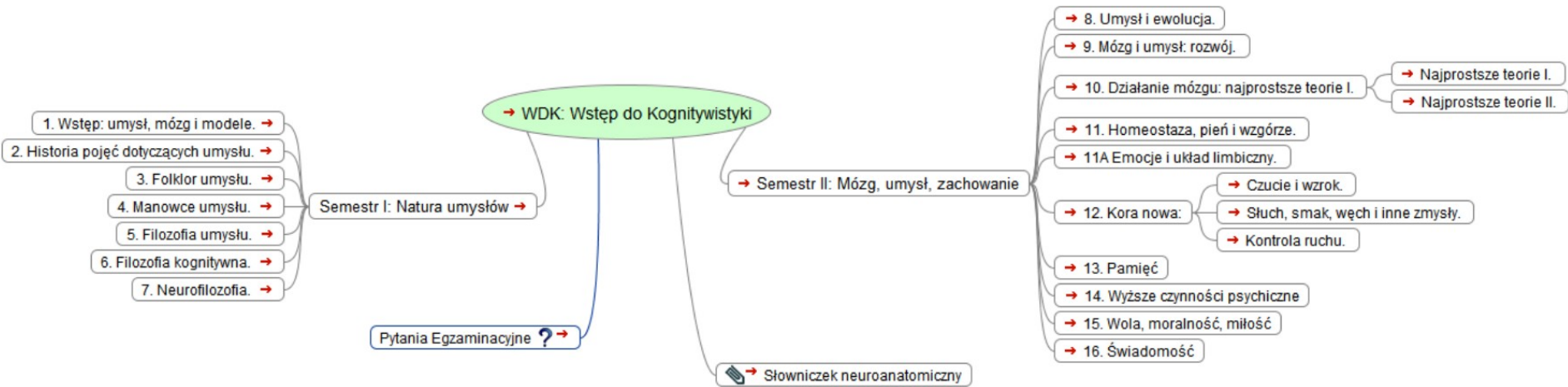
In should gradually collect bibliometric data from all repositories and become main tool for impact evaluation.

Liczba publikacji



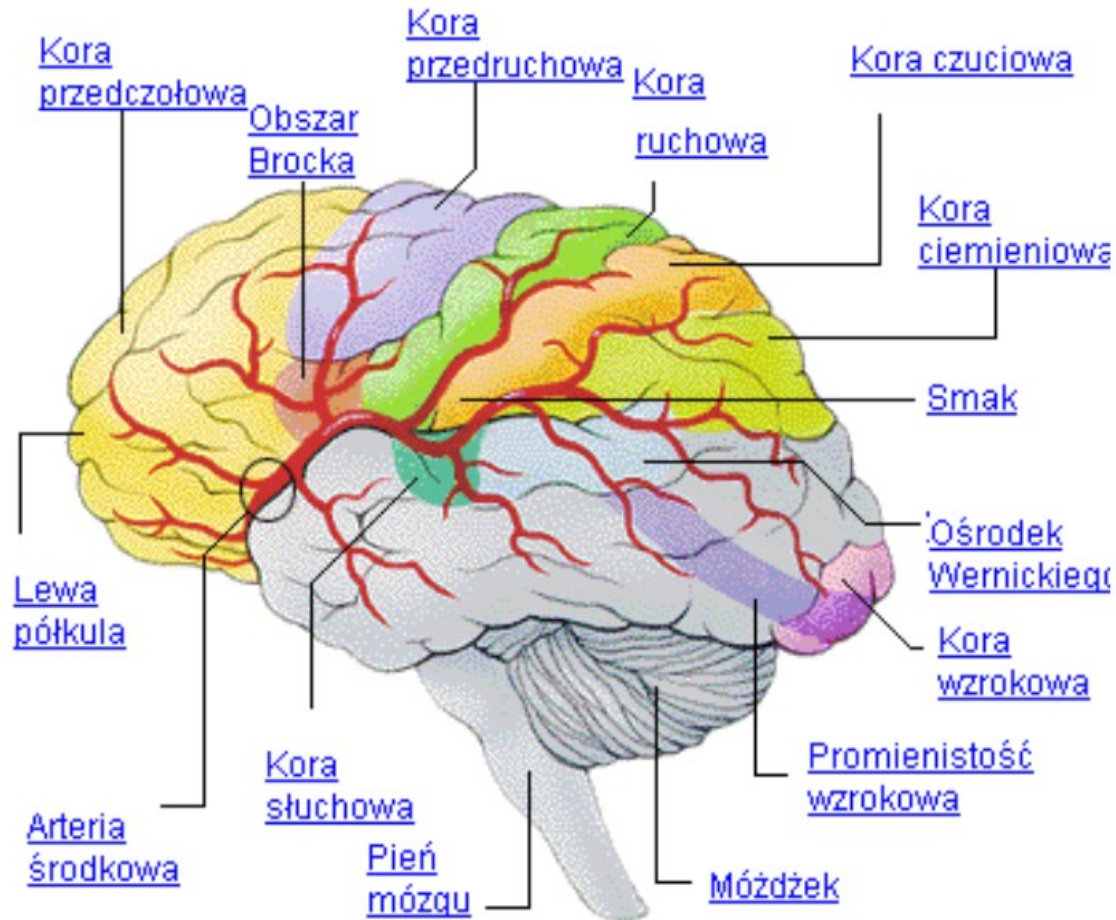
Wzrost liczby publikacji znajdujących się w bazie PBN

Map of my lectures



Jak działa mózg?

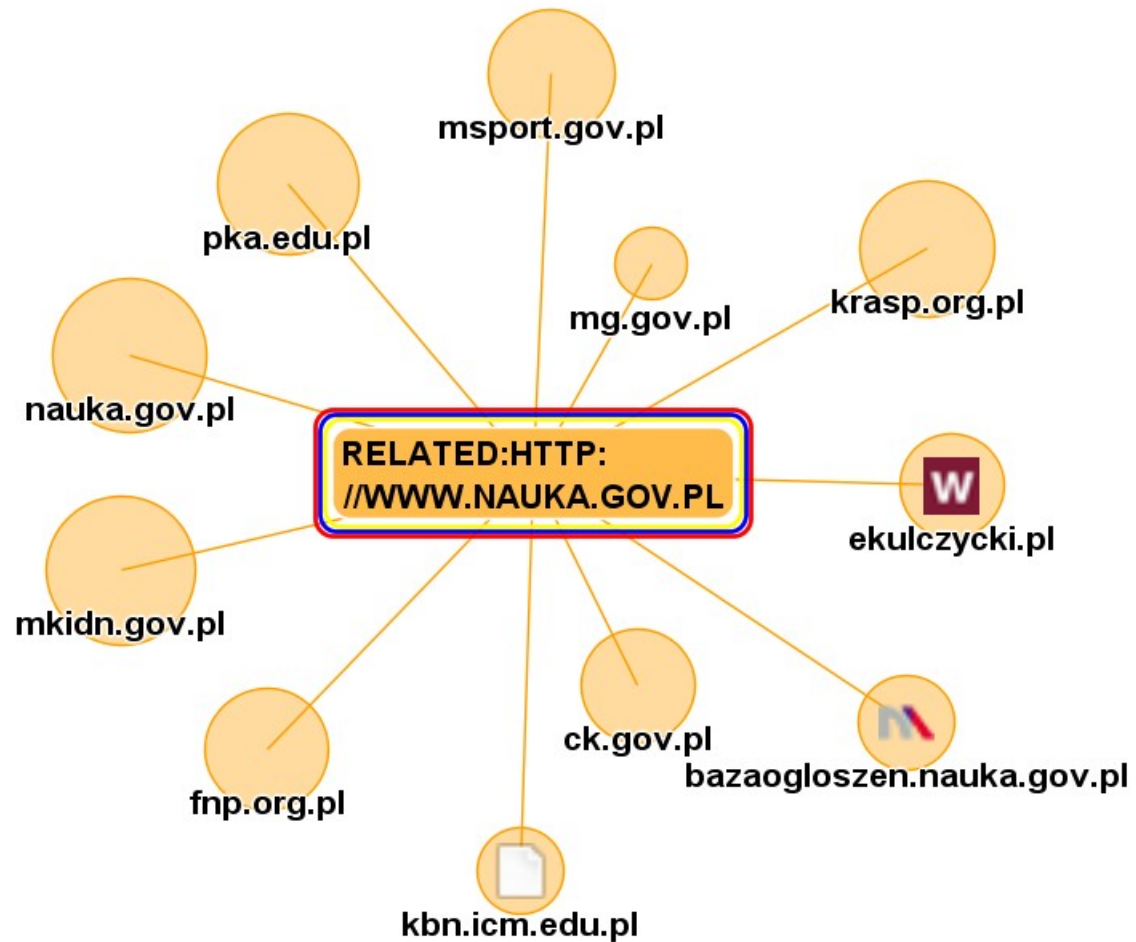
Kliknij na obrazku by obejrzeć notatki do wykładu na temat funkcji różnych obszarów mózgu.
Uwaga! nie wszystko jeszcze działa poprawnie



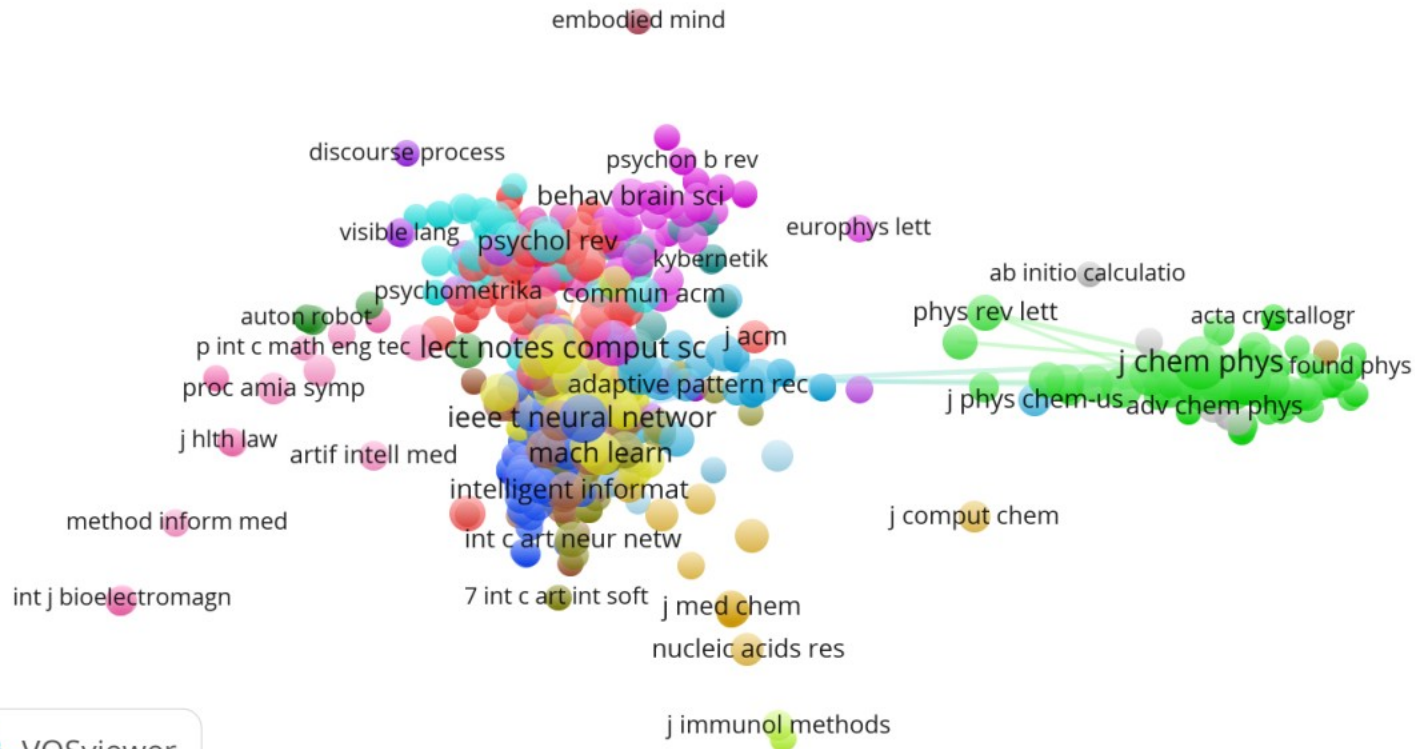
http://www.touchgraph.com

Touchgraph

Shows links
between web
pages

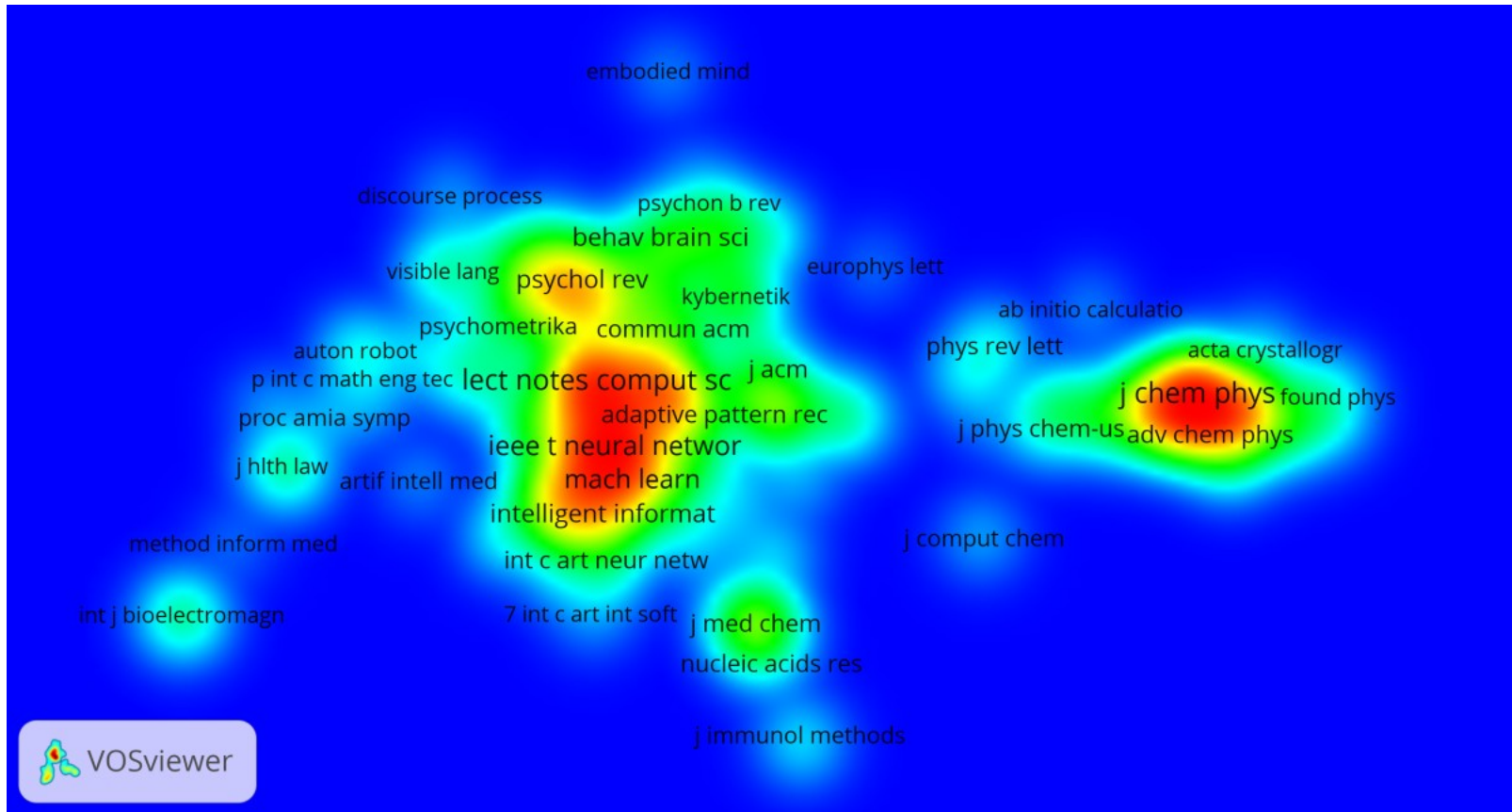


VOSviewer and WoS



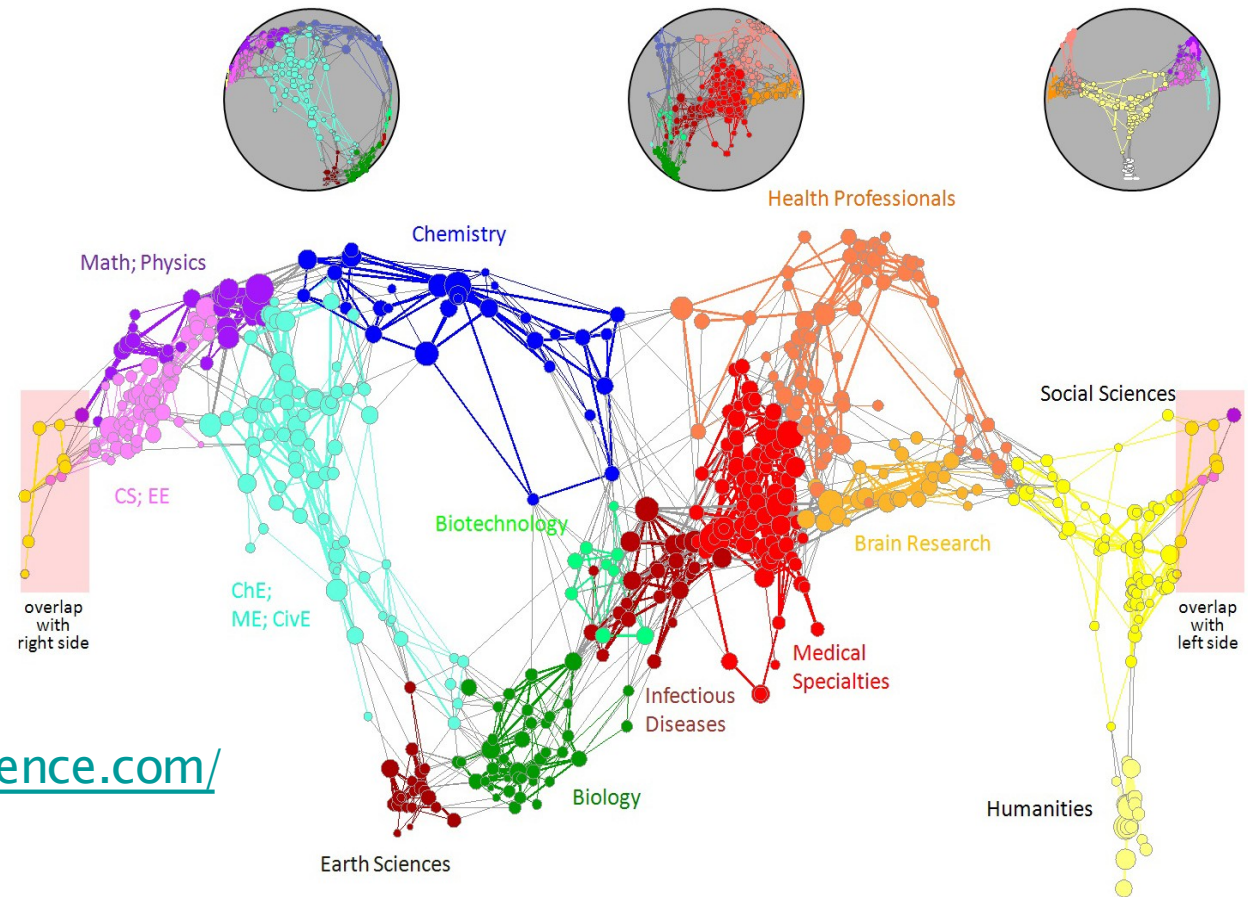
Journals that have cited my work, VOSviewer and WoS

VOSviewer density map



Journals that have cited my work, VOSviewer and WoS

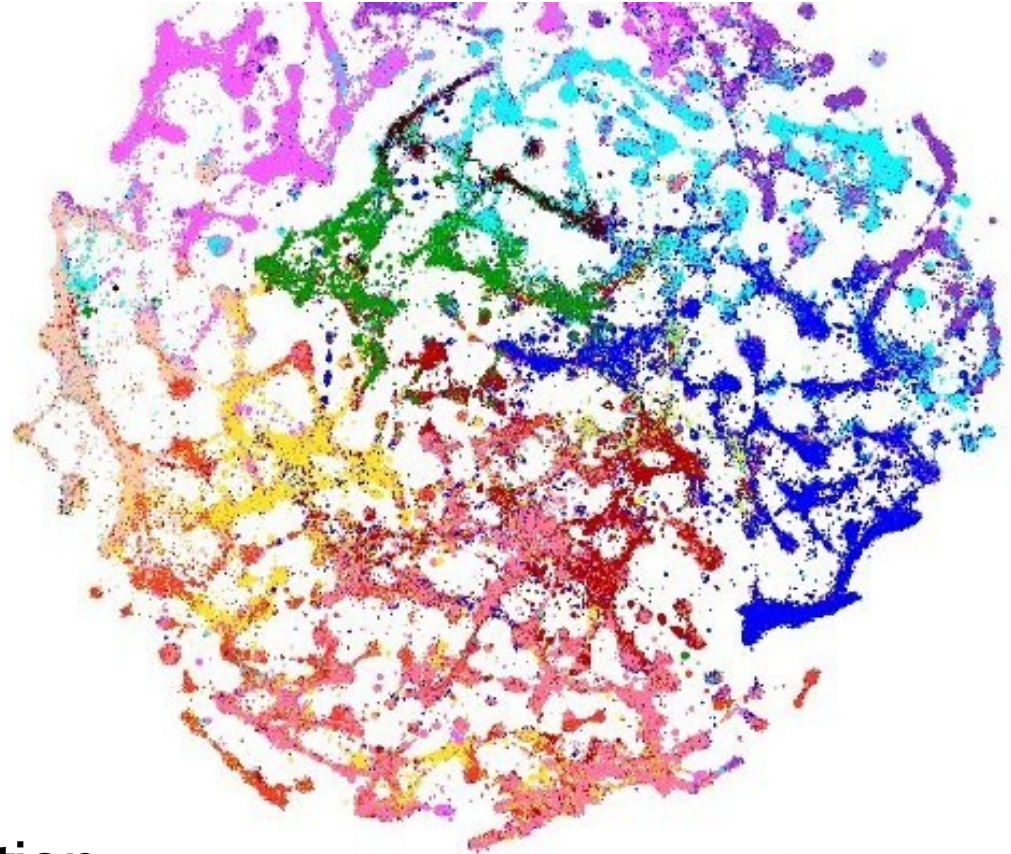
Kevin Boyack, Places and Spaces



<http://www.mapofscience.com/>

ISI catalogue 2007. Size: # of citations; links = cosine similarity.
Basic structure is robust. From Rafols, Porter, Leydesdorff, 2010.

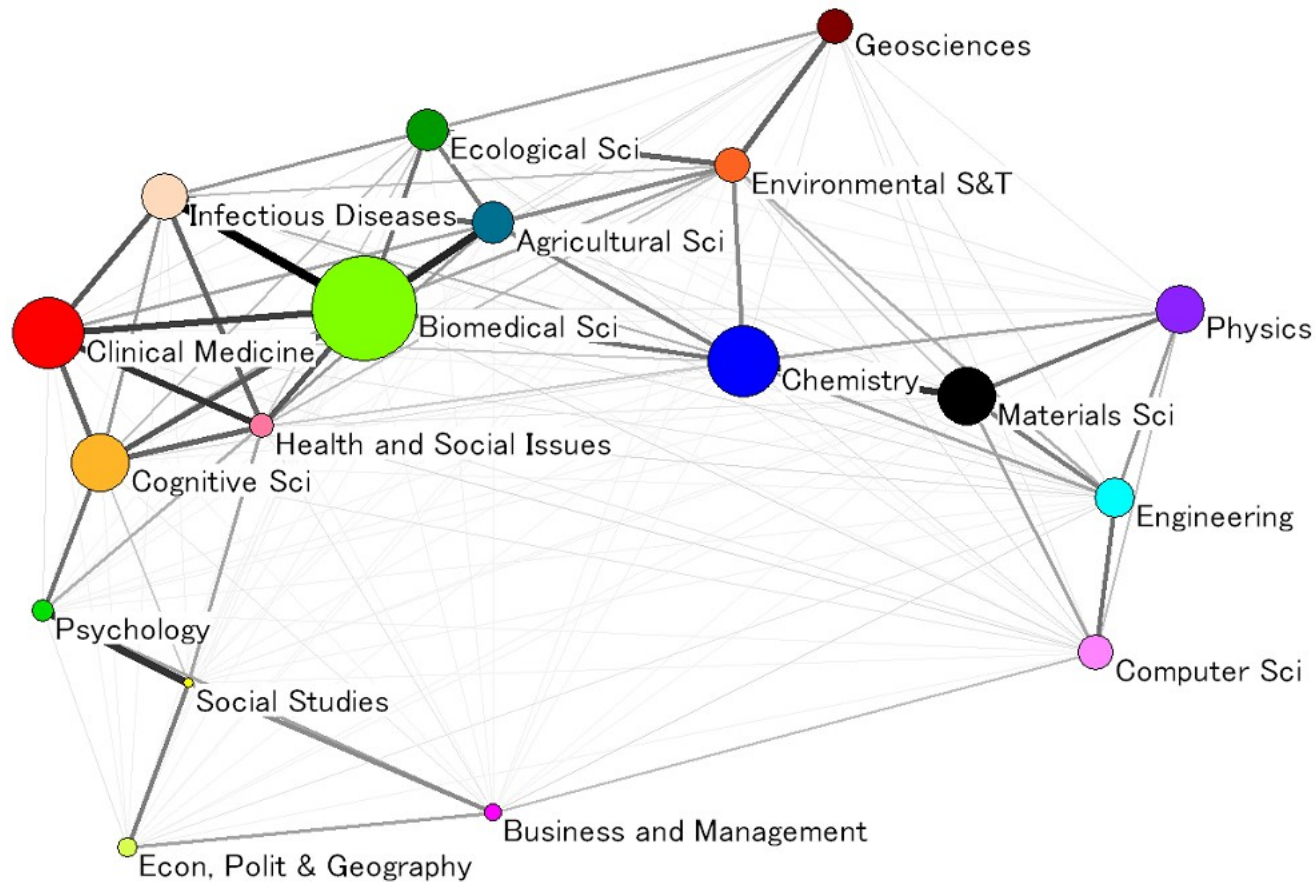
Structure of Science – Knowscape



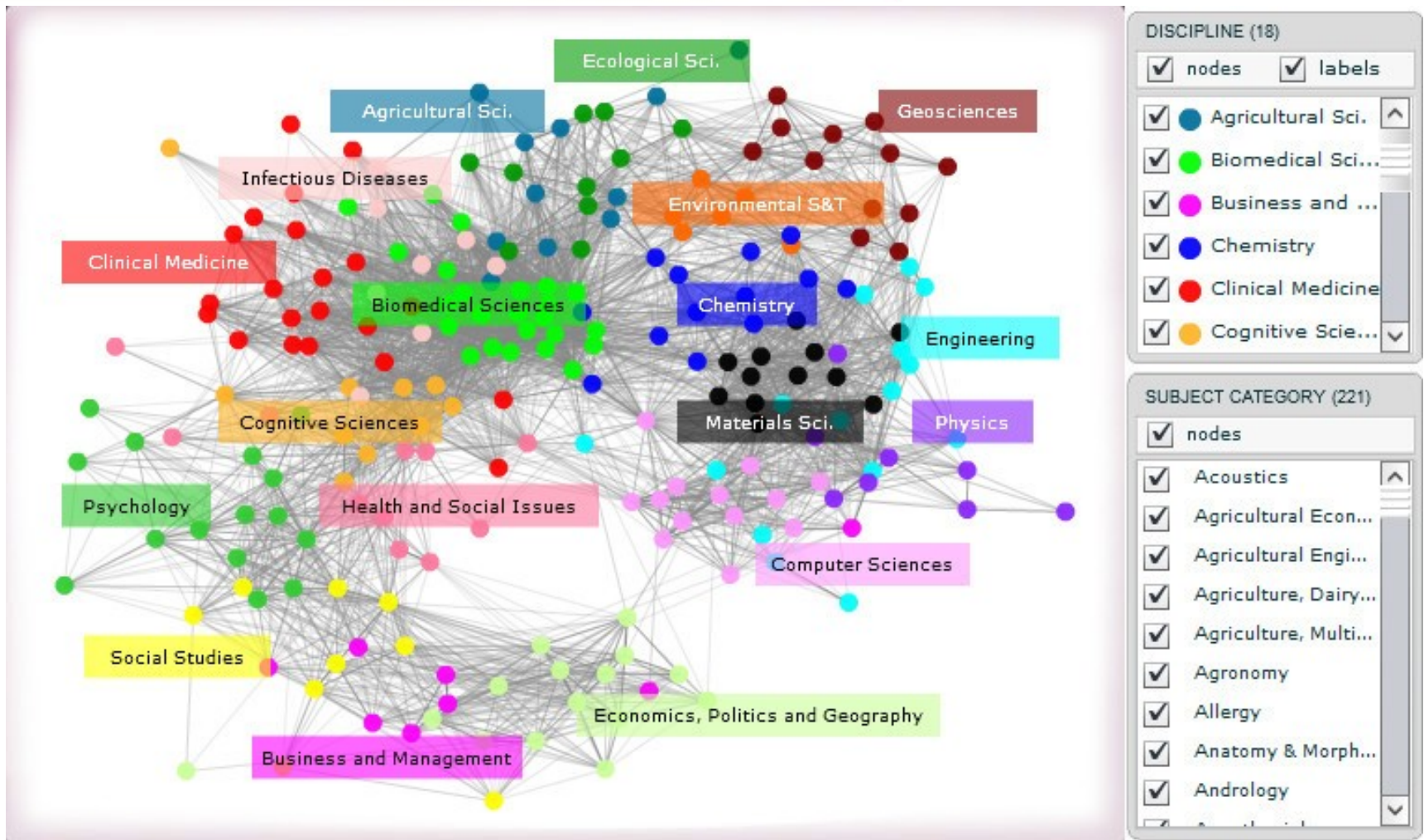
<http://knowscape.org>

Spherical projection

Core structure of Science

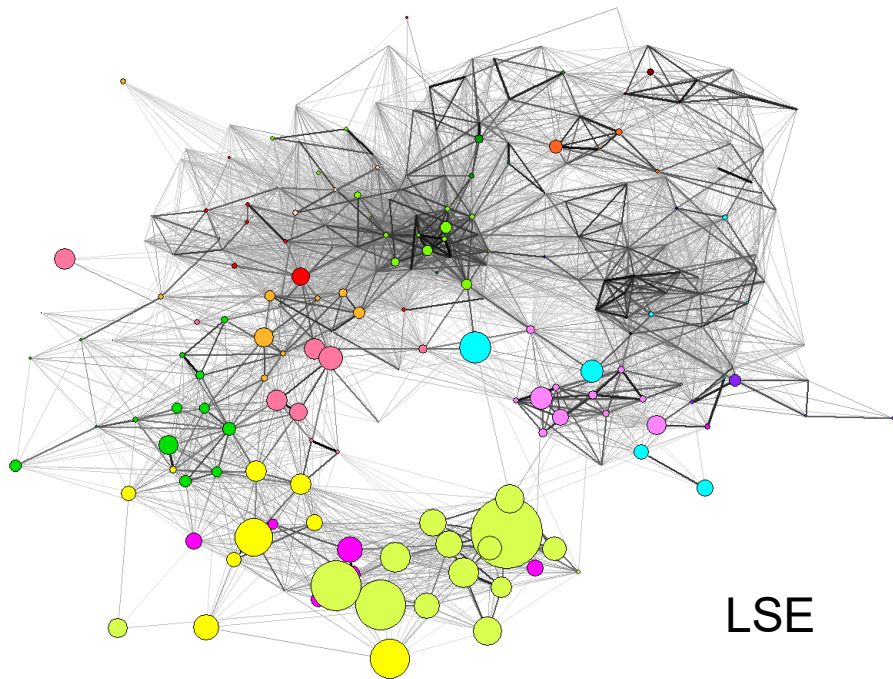
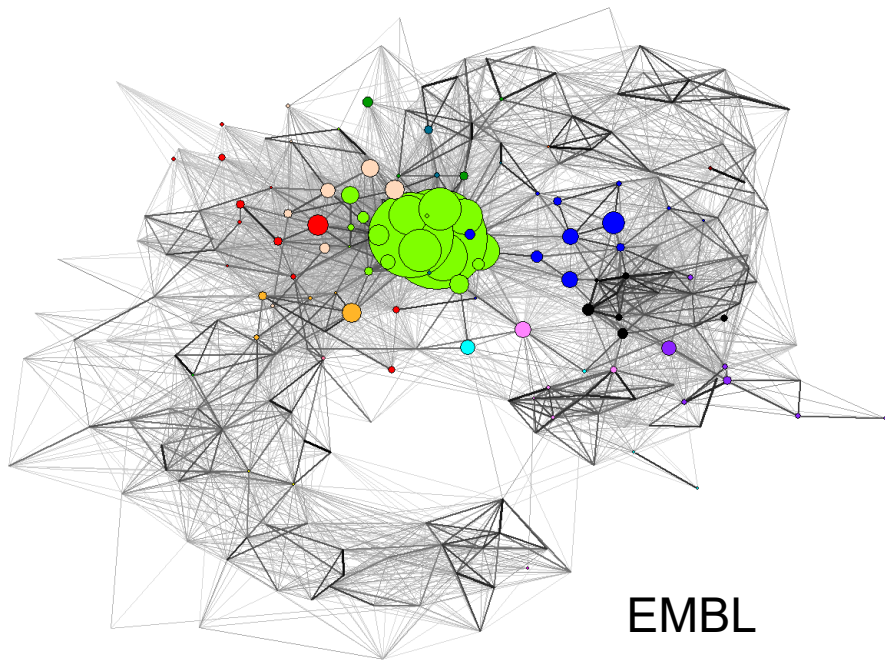
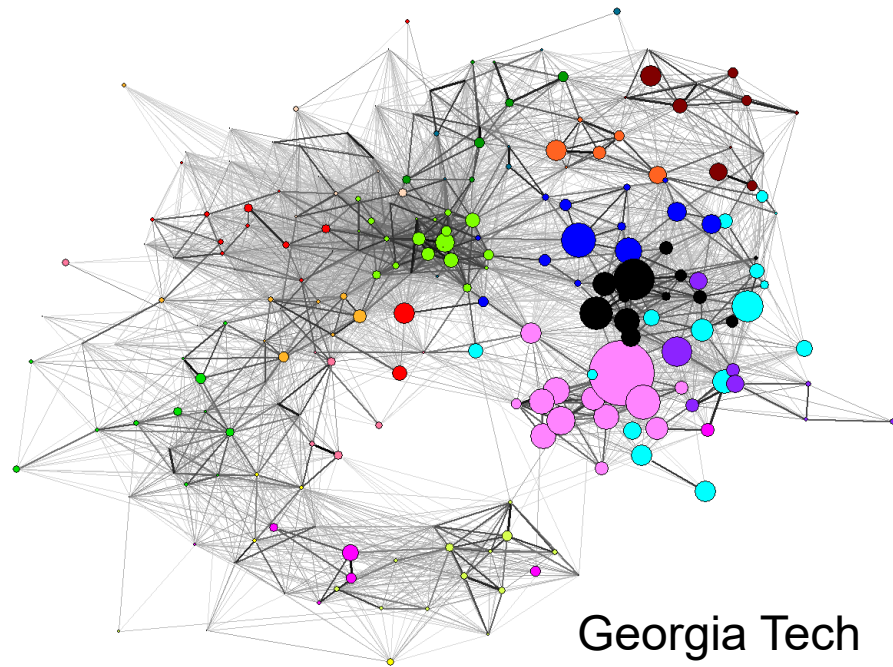
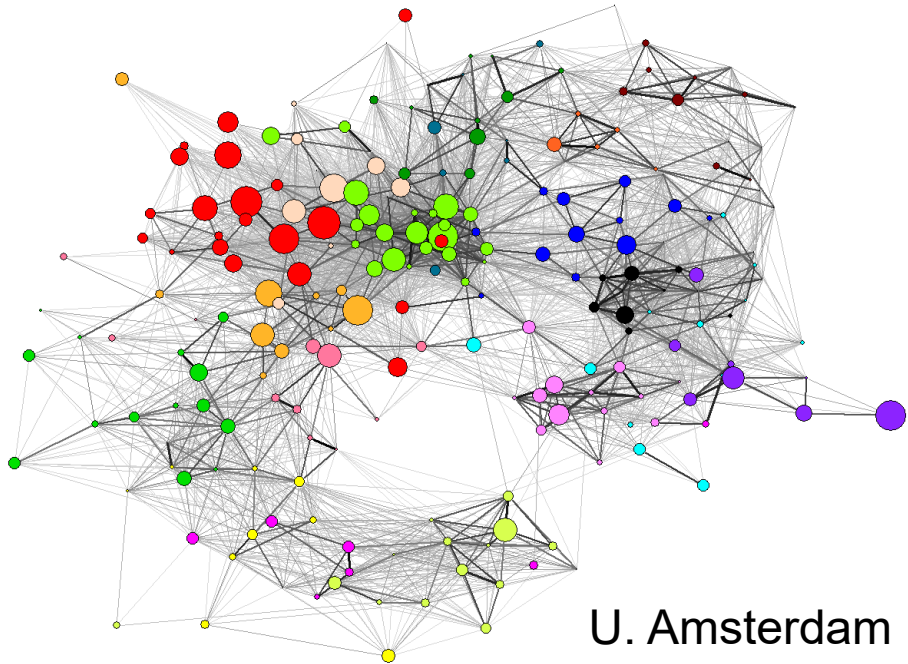


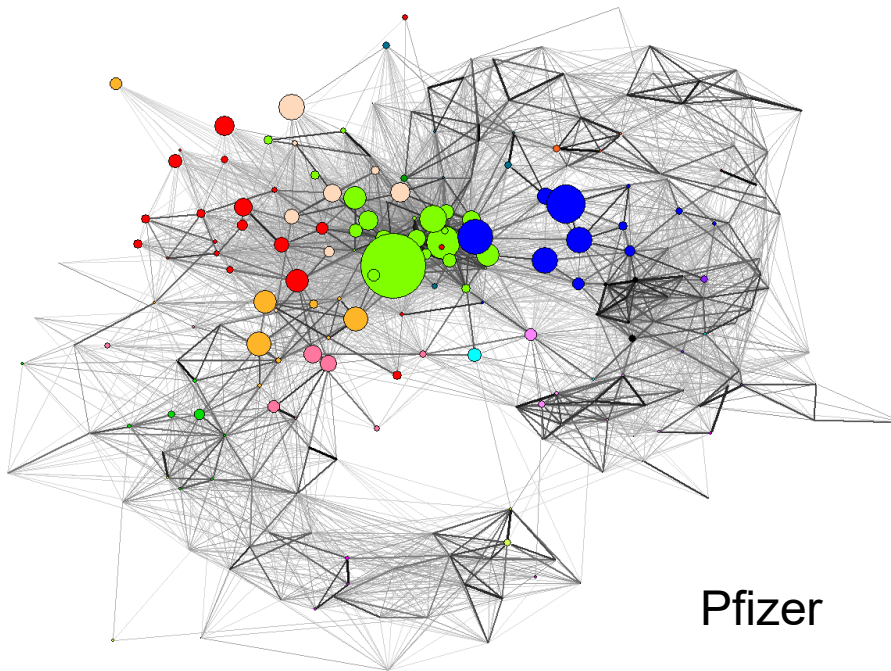
ISI catalogue 2007. Size: # of citations; links = cosine similarity.
Basic structure is robust. From Rafols, Porter, Leydesdorff, 2010.



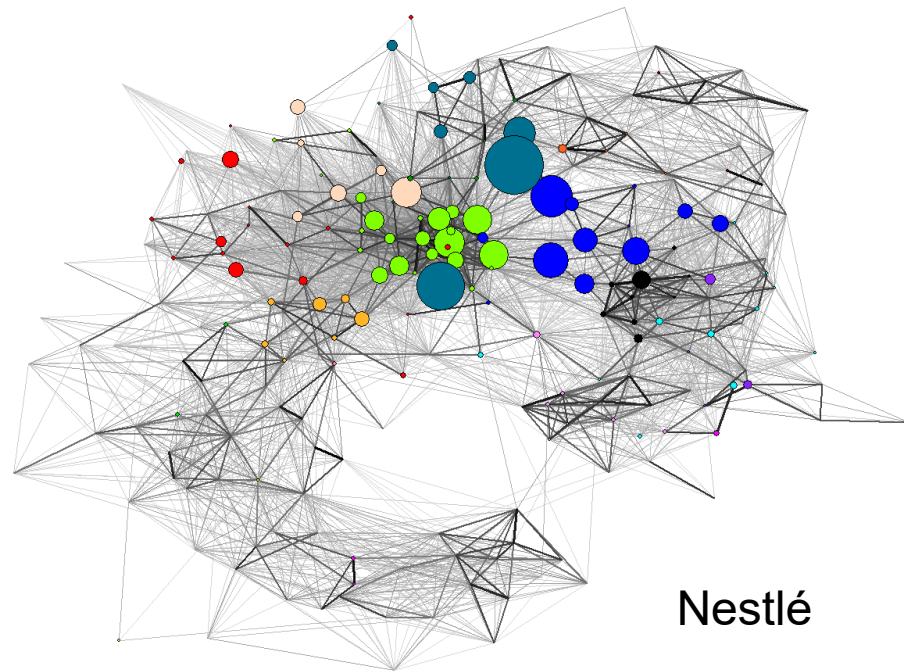
More detailed global map with subfields.

<http://idr.gatech.edu/maps.php>

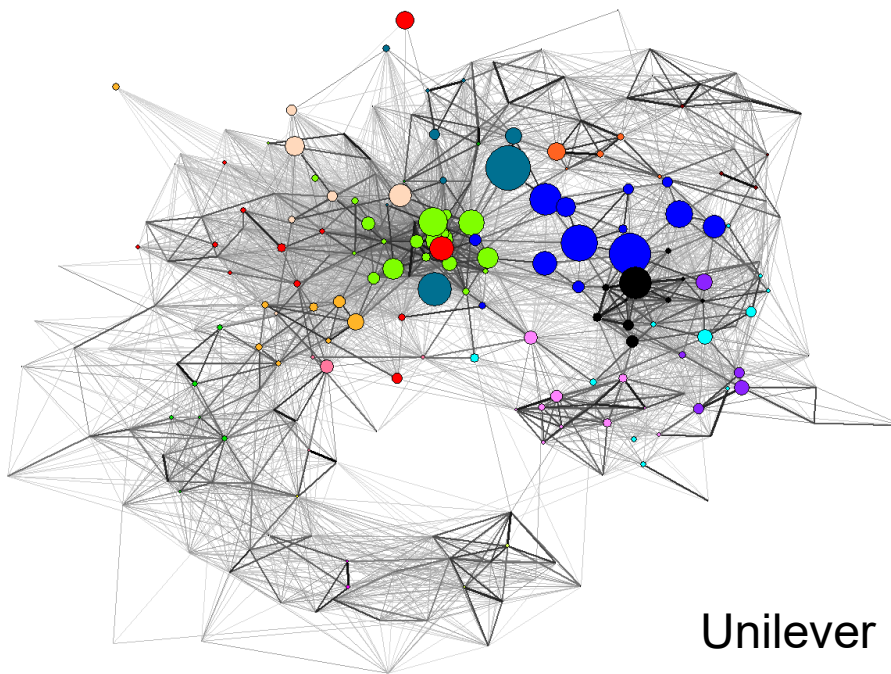




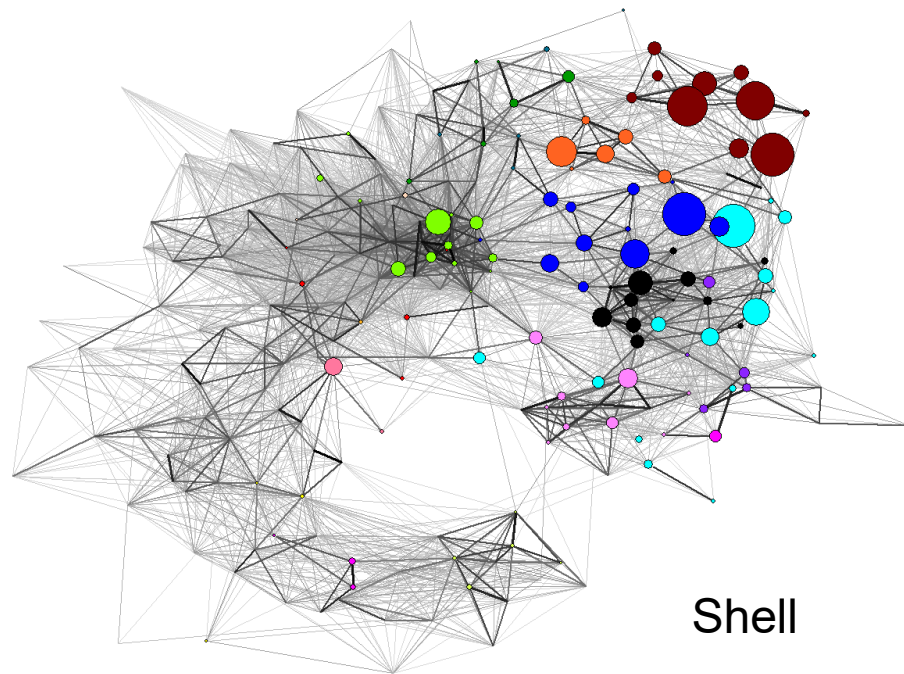
Pfizer



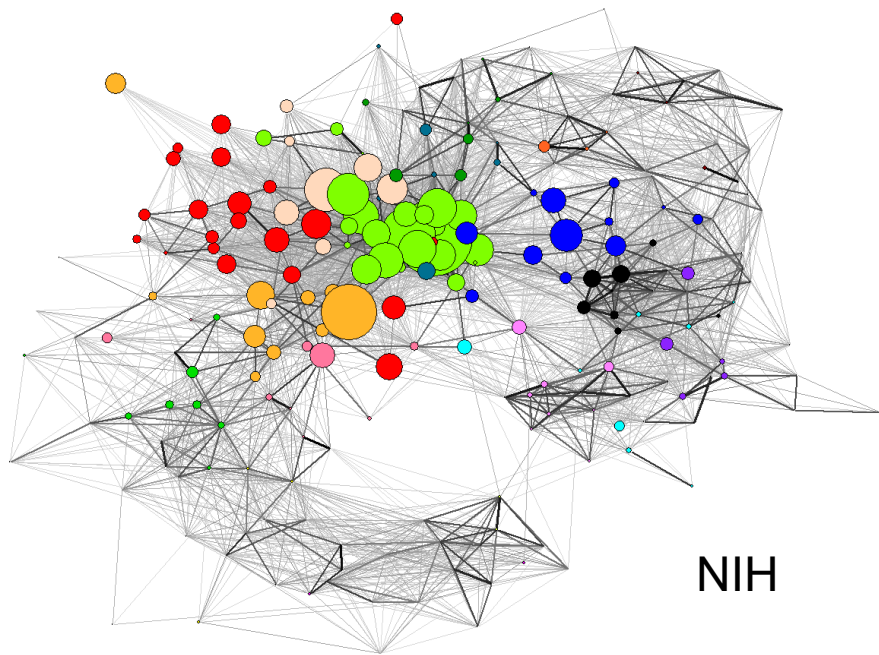
Nestlé



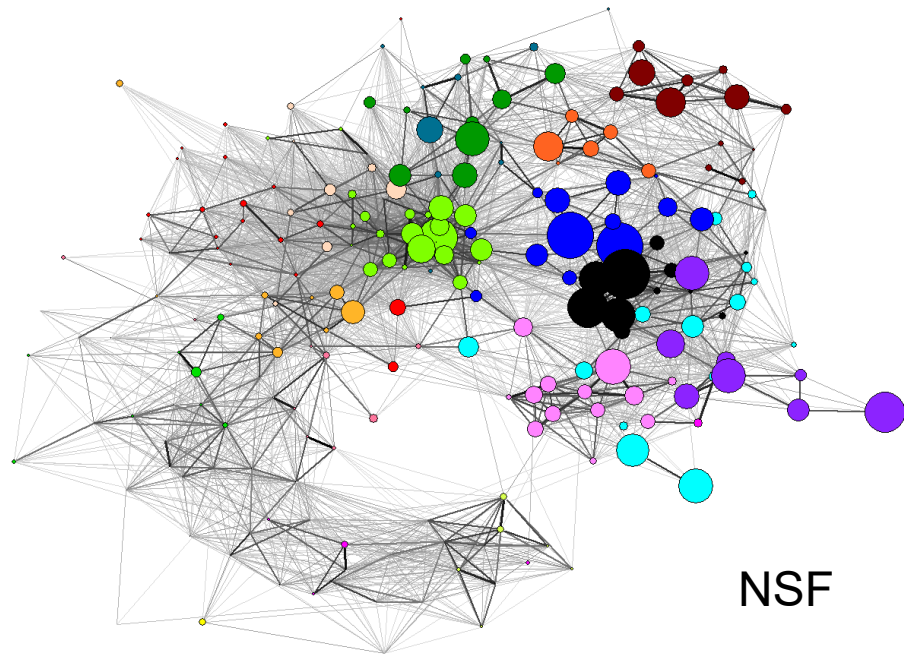
Unilever



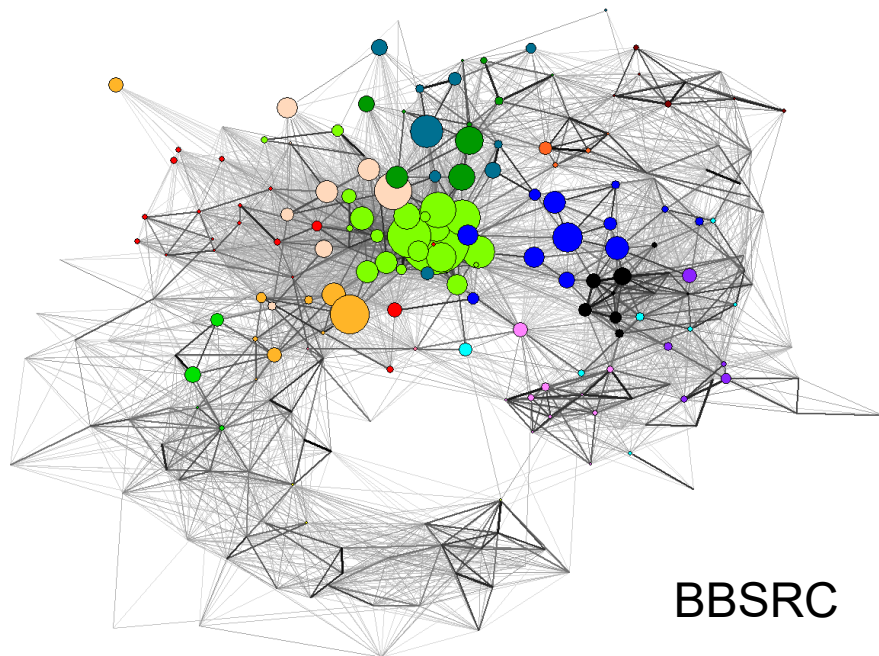
Shell



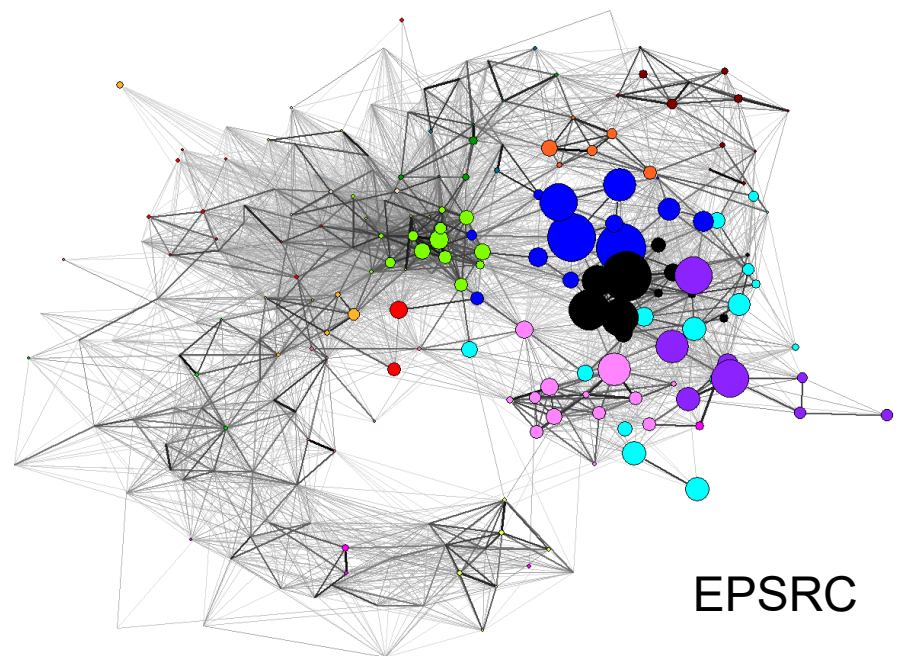
NIH



NSF



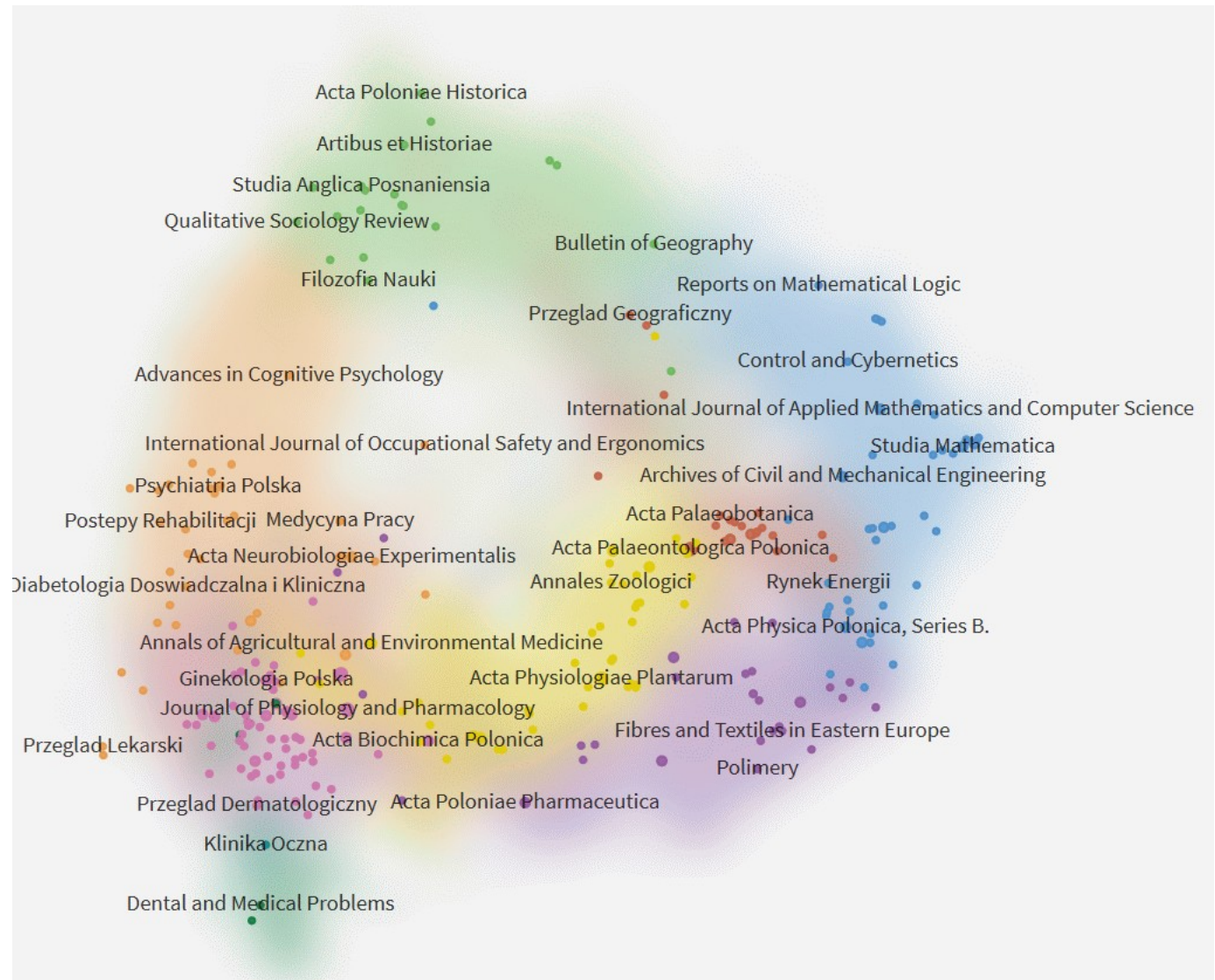
BBSRC



EPSRC

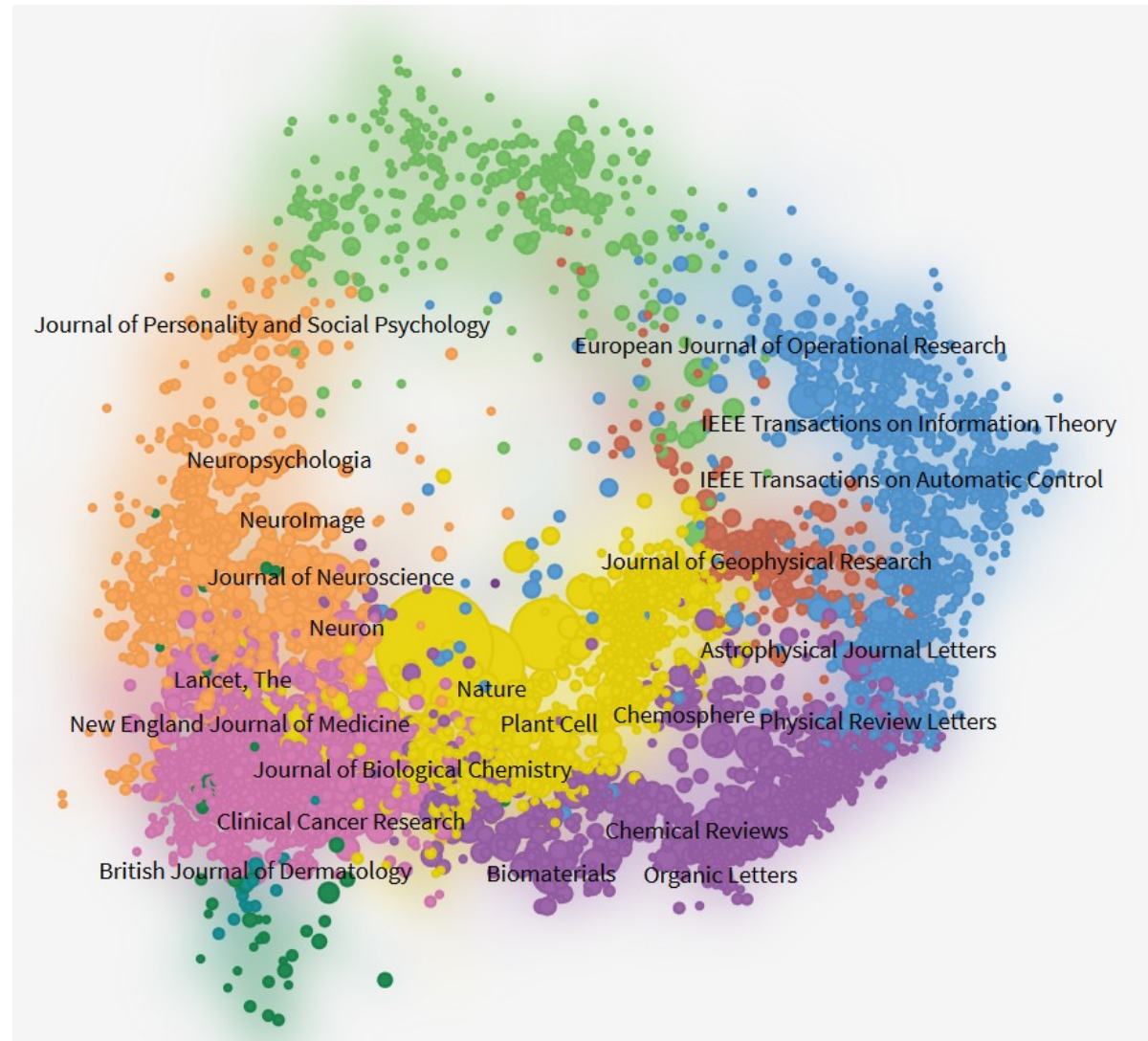
SciMago,
Using
Scopus.

List of
260 journals
published in
Poland
indexed by
Scopus.



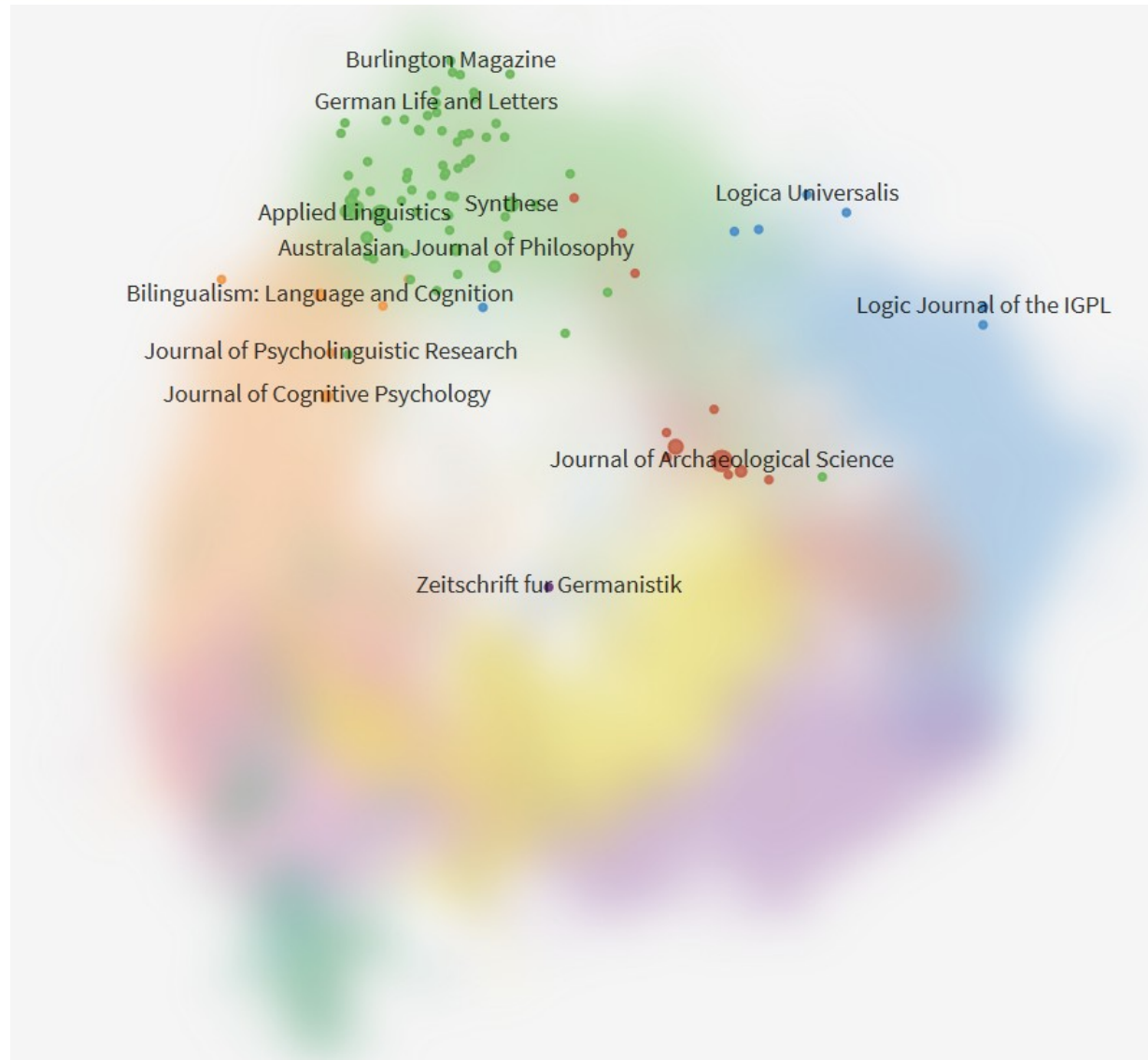
SciMago,
Using Scopus.

List of **all**
journals with
country of
authors = Poland



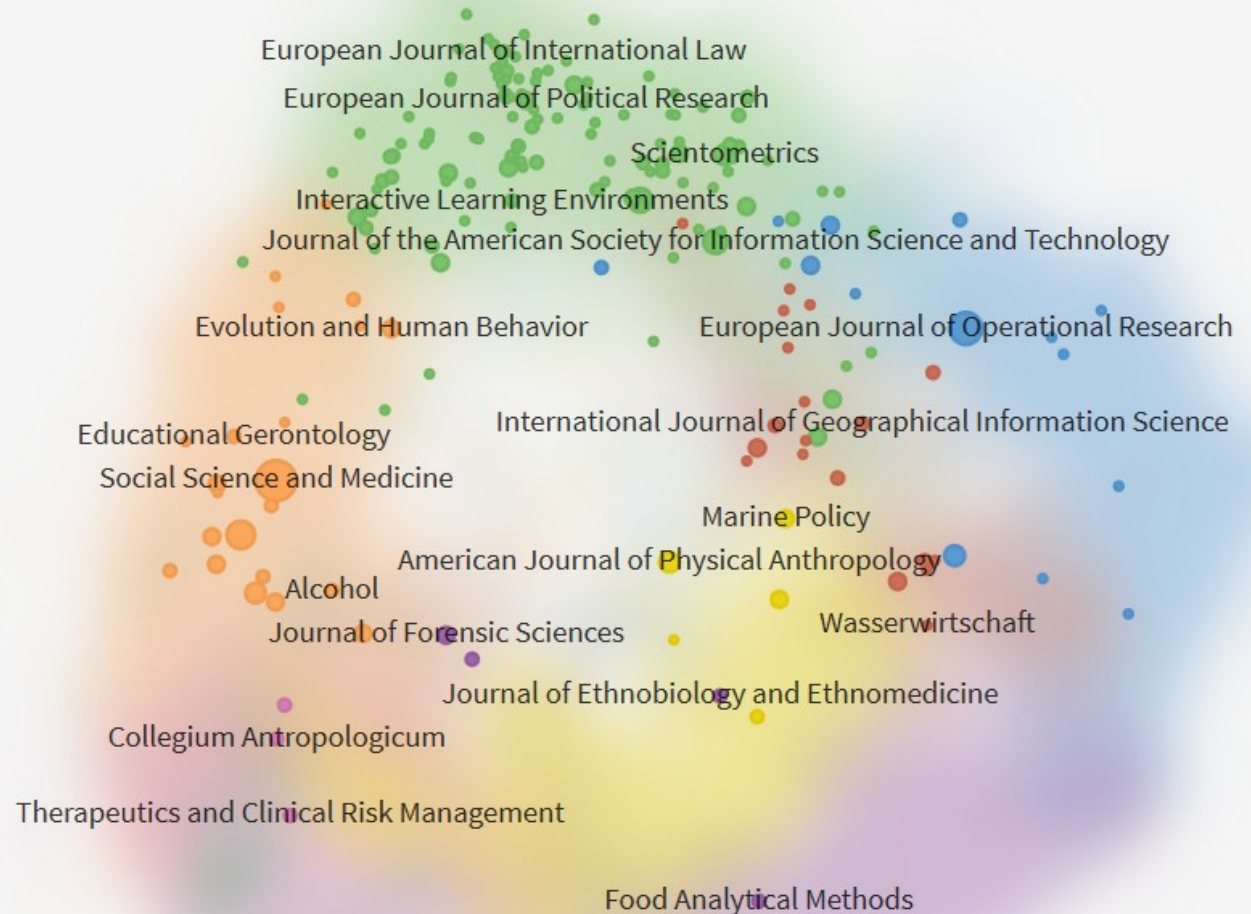
SciMago, Using Scopus.

List of
journals
**in arts and
humanities**
with country of
authors
= Poland



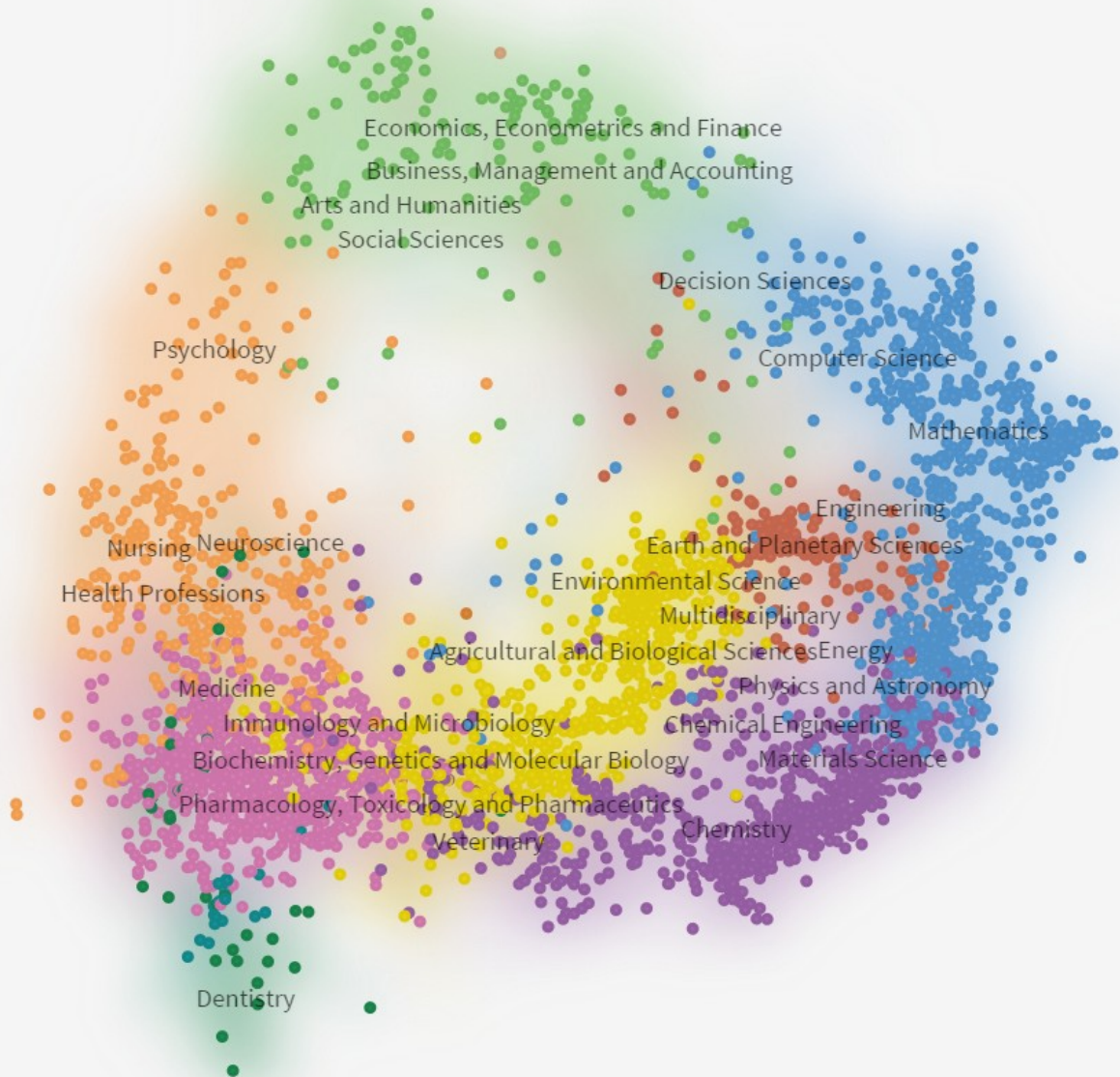
SciMago,
using Scopus.

List of
journals
in social
sciences,
with country
of authors
= Poland



SciMago,
using Scopus.

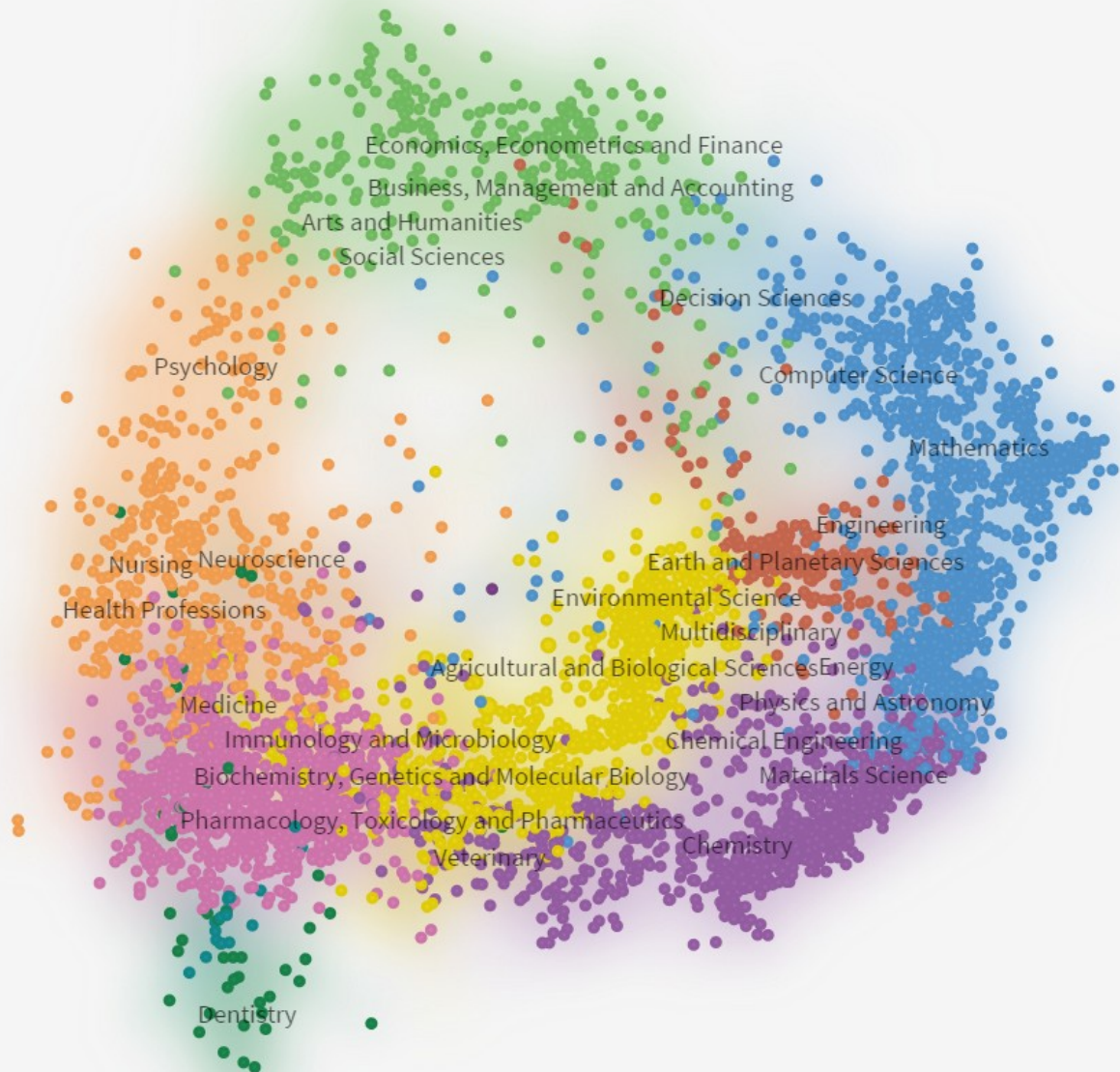
Citations 2007,
with country
of authors
= Poland

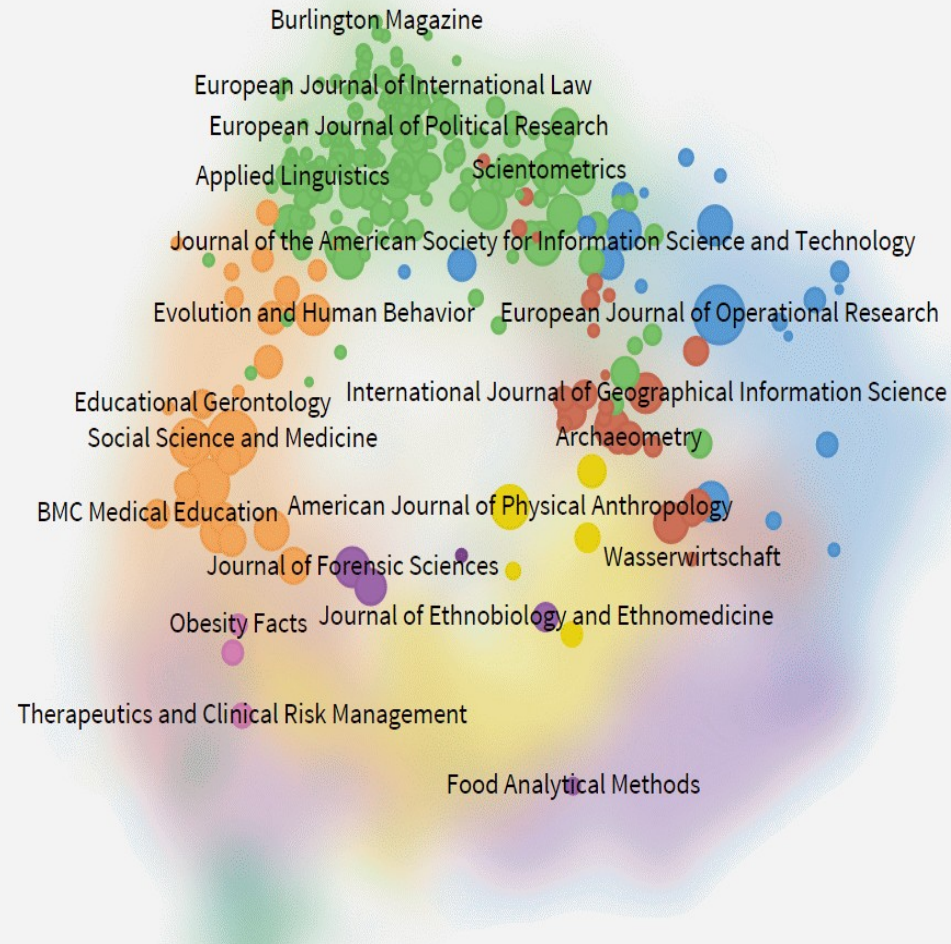
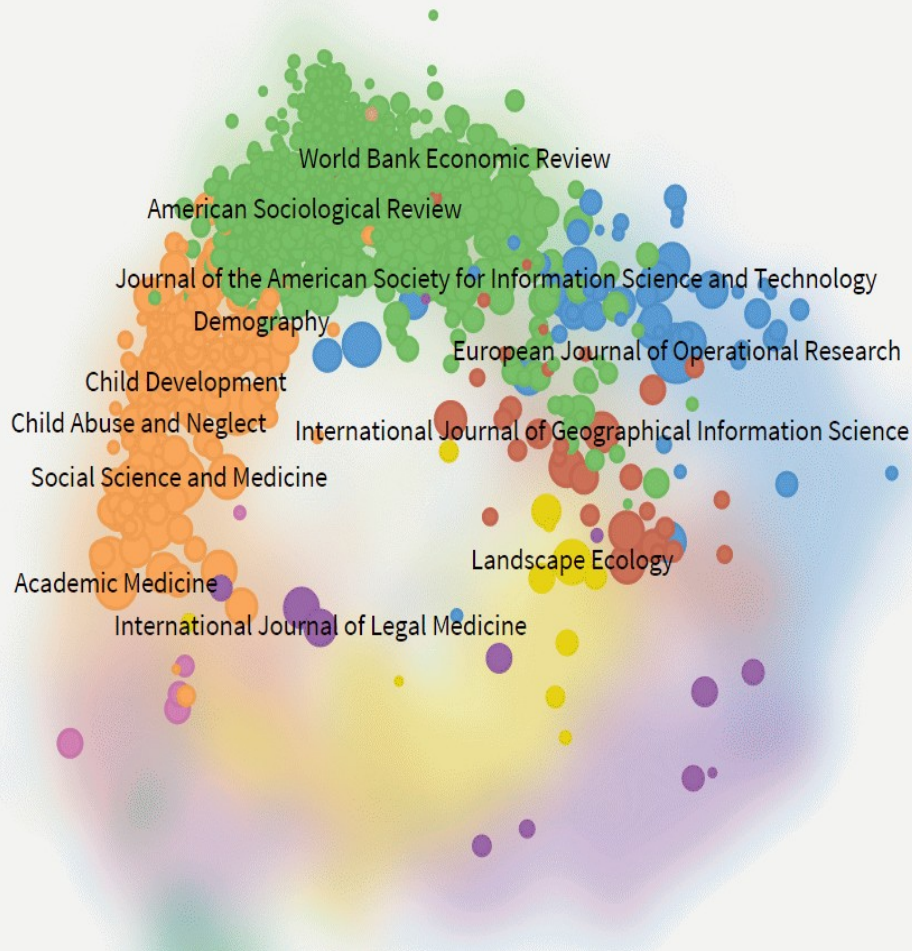


SciMago,
using Scopus.
















Citations 2012,
with country
of authors
= Poland

















Some
improvement
visible, more
interdisciplinary
papers cited.




















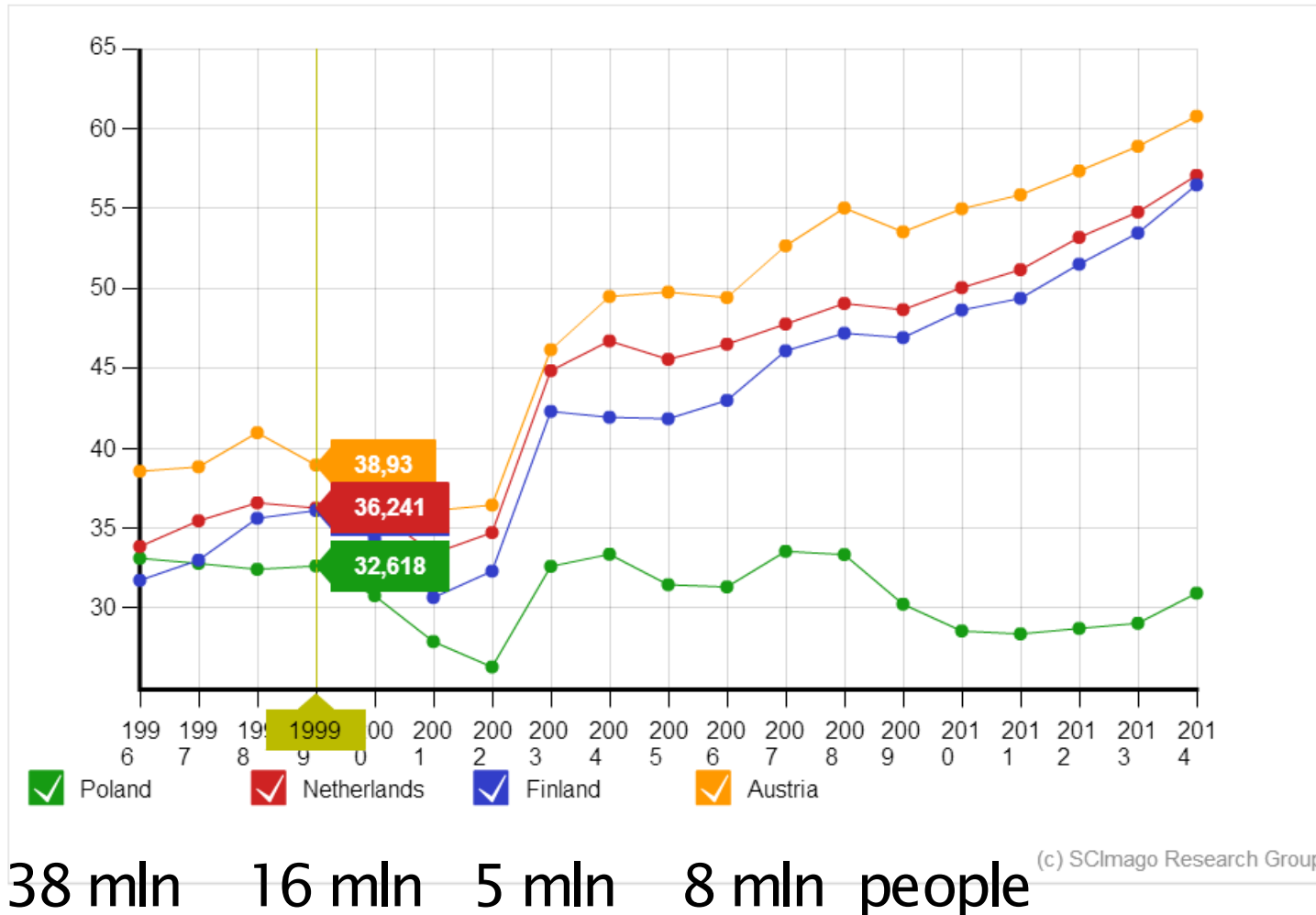
The Netherlands – Poland, using journal 2012 H-index
SS+AH comparison, using SciMago.

	Country	Documents	Citable documents	Citations	Self-Citations	Citations per Document	H index
1	 Russian Federation	701.029	689.095	4.289.618	1.273.073	6,50	390
2	 Poland	431.016	418.917	3.491.958	901.545	9,57	371
3	 Czech Republic	213.209	206.738	1.867.611	440.161	10,74	294
4	 Hungary	136.034	130.299	1.660.840	264.809	13,60	301
5	 Ukraine	133.650	131.490	635.570	176.428	5,03	174
6	 Romania	125.576	122.884	619.956	153.395	7,24	167
7	 Slovenia	64.483	62.170	611.672	115.616	11,31	189
8	 Slovakia	72.847	70.964	561.511	113.733	9,07	180
9	 Croatia	72.110	69.675	459.356	97.694	7,53	177
10	 Bulgaria	54.894	53.485	455.406	73.045	9,15	167
11	 Estonia	25.458	24.479	313.735	55.005	15,83	162
12	 Lithuania	32.137	31.399	227.339	51.689	9,70	133
13	 Serbia	45.000	43.151	188.381	47.922	5,33	100
14	 Belarus	28.941	28.543	175.290	32.229	6,17	122
15	 Armenia	11.741	11.444	113.464	19.563	10,61	126

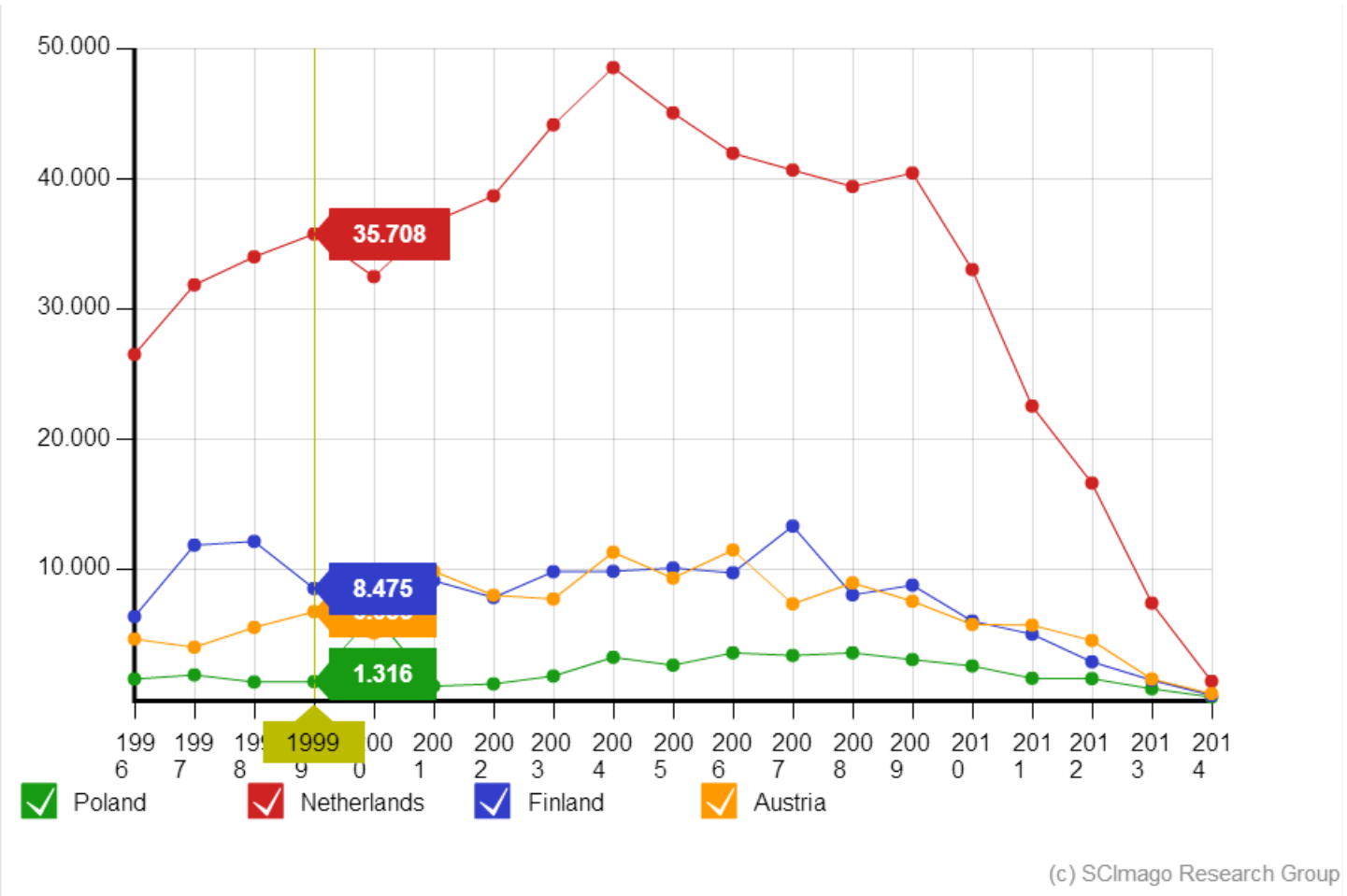
	Country	Documents	Citable documents	Citations	Self-Citations	Citations per Document	H index
1	 United Kingdom	2.397.817	2.103.145	44.011.201	10.321.539	21,03	1.015
2	 Germany	2.176.860	2.045.433	35.721.869	9.141.181	18,50	887
3	 France	1.555.629	1.468.286	24.700.140	5.516.943	17,95	811
4	 Italy	1.200.448	1.117.013	18.019.464	4.186.908	17,52	713
5	 Netherlands	681.804	628.678	14.278.721	2.321.446	24,56	694
6	 Spain	952.099	884.670	12.628.097	3.068.362	16,14	591
7	 Switzerland	493.857	460.824	10.872.269	1.458.098	26,10	686
8	 Sweden	460.607	433.674	9.417.604	1.448.940	23,21	614
9	 Belgium	372.093	348.017	6.691.791	948.874	21,01	547
10	 Denmark	263.026	245.115	5.494.671	779.833	24,94	518
11	 Austria	268.472	250.181	4.334.382	583.299	19,24	449
12	 Finland	234.846	223.366	4.295.721	666.893	21,20	443
13	 Norway	206.965	190.800	3.354.827	530.420	20,17	402
14	 Greece	224.897	209.043	2.702.414	444.424	14,36	326
15	 Portugal	189.052	179.134	2.096.242	407.892	15,17	297
16	 Ireland	135.843	123.585	1.999.703	233.733	19,01	332

	Country	Documents	Citable documents	Citations	Self-Citations	Citations per Document	H index
1	 Japan	2.074.872	2.008.410	27.040.067	7.619.559	13,79	745
2	 China	3.617.355	3.569.652	19.110.353	10.462.121	7,44	495
3	 South Korea	739.229	719.338	7.063.429	1.528.443	12,38	424
4	 India	998.544	944.632	6.989.150	2.409.025	9,61	383
5	 Taiwan	491.560	477.442	4.790.230	1.075.153	12,17	331
6	 Hong Kong	200.580	189.621	2.951.215	393.784	16,87	359
7	 Singapore	192.942	182.169	2.561.645	331.822	15,78	349
8	 Thailand	109.832	104.982	976.328	162.255	13,00	213
9	 Malaysia	153.378	148.844	670.387	183.198	9,41	165
10	 Pakistan	81.612	78.219	425.467	118.262	7,59	148
11	 Indonesia	32.355	30.770	230.610	26.258	12,72	140
12	 Philippines	17.783	16.507	219.804	22.832	16,41	147
13	 Viet Nam	24.473	23.559	204.089	29.994	13,84	133
14	 Bangladesh	26.924	25.901	184.202	35.455	10,09	124
15	 Sri Lanka	10.989	10.222	96.953	9.297	11,87	107

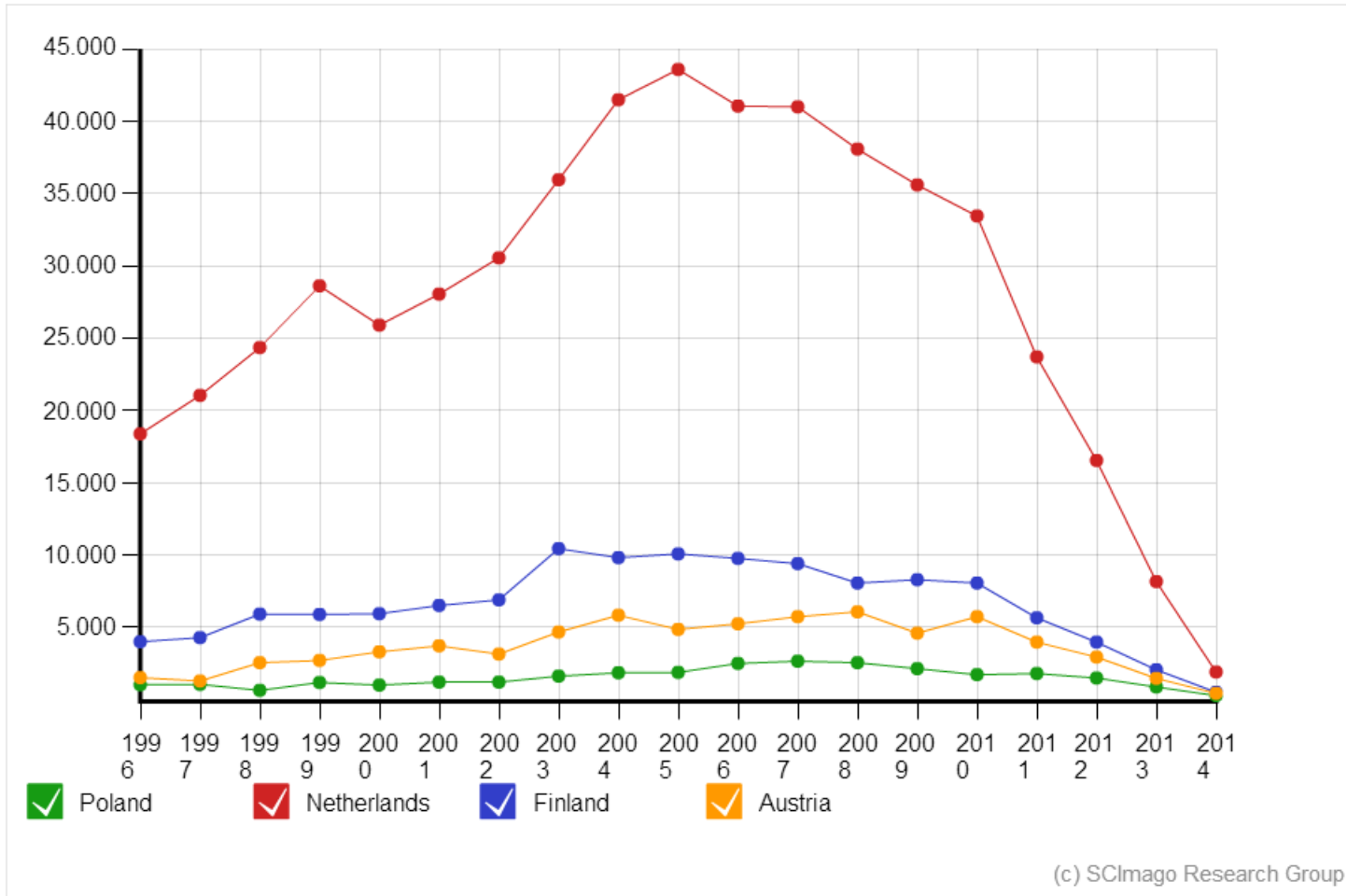
Percentage of documents with more than one country:



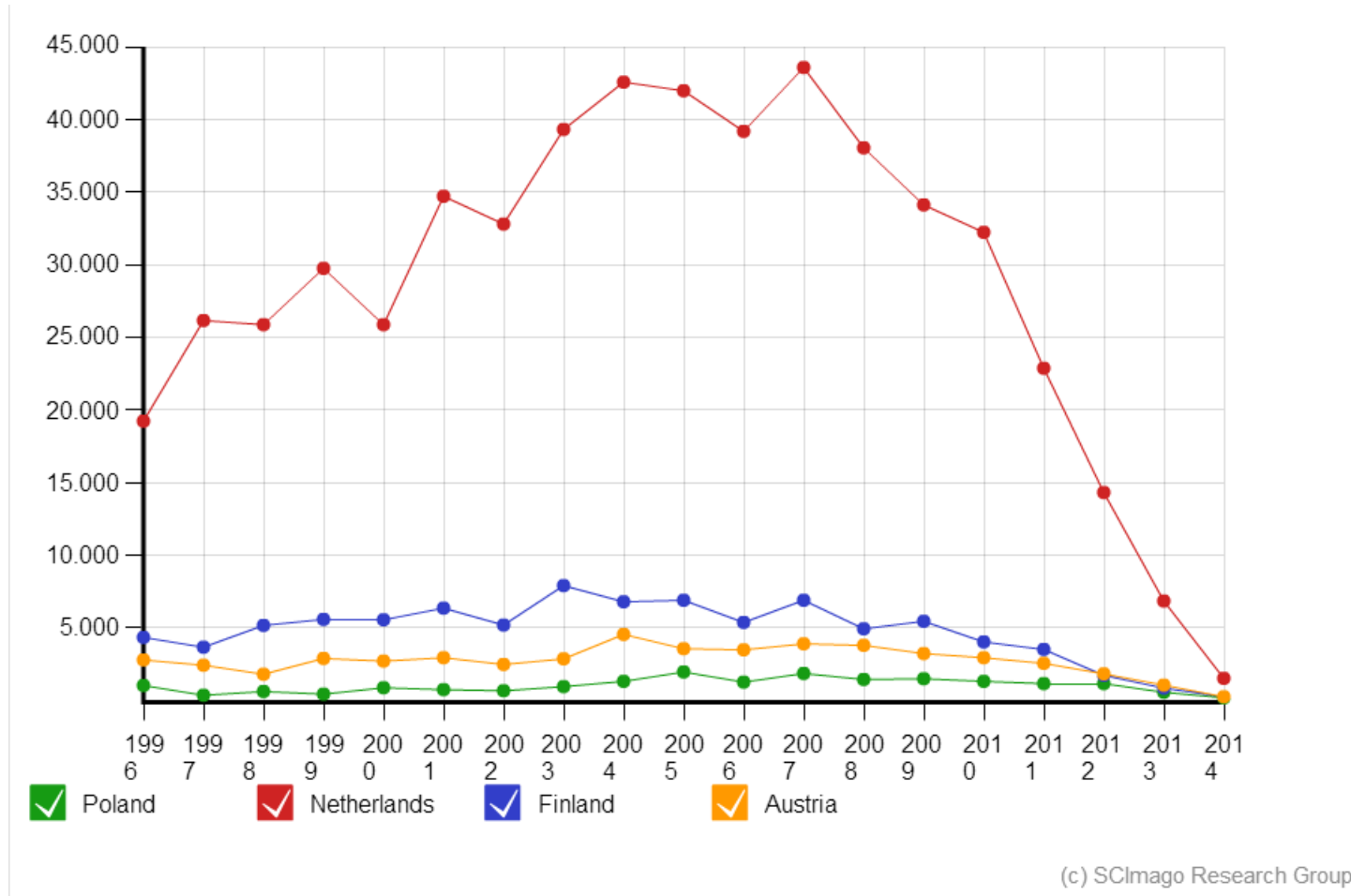
Cites, Arts and Humanities



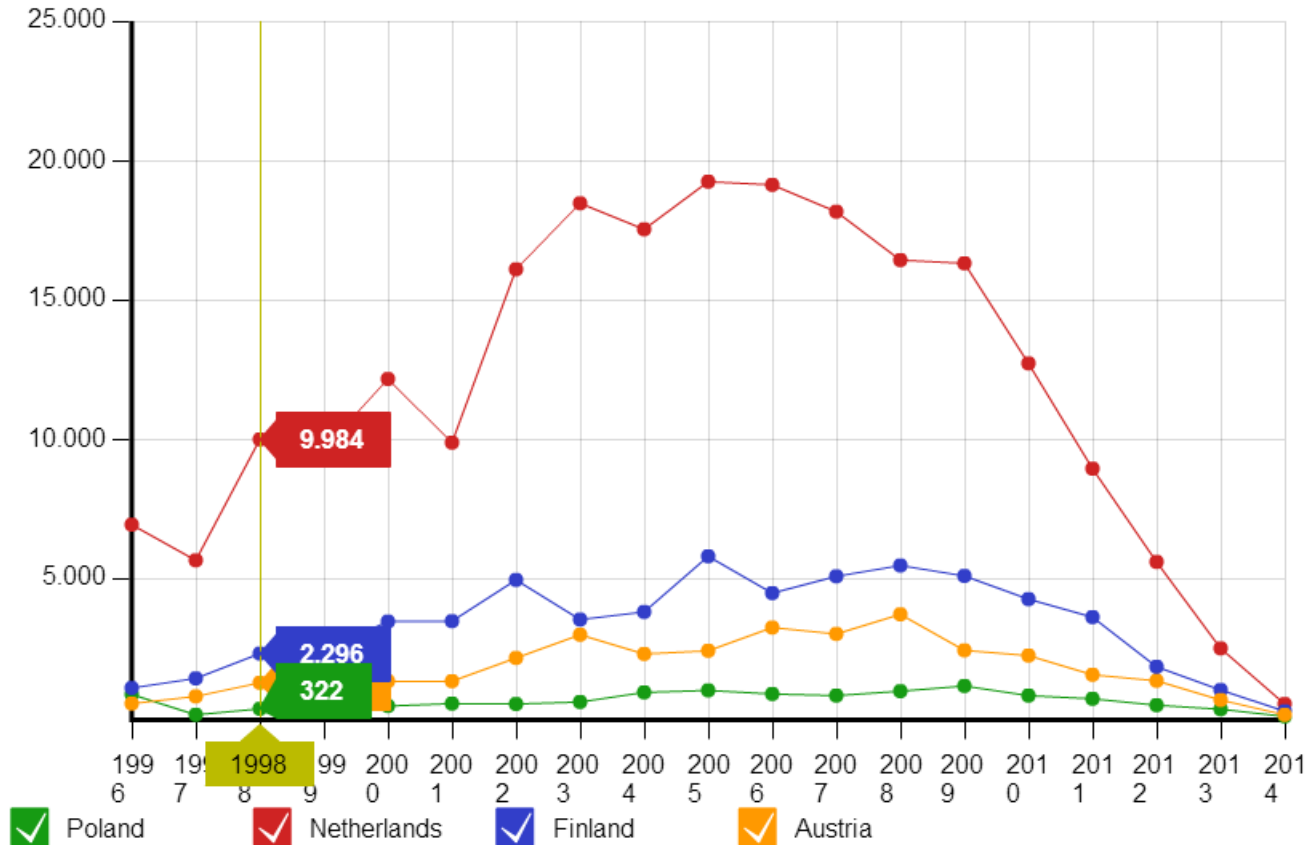
Cites, Social Sciences



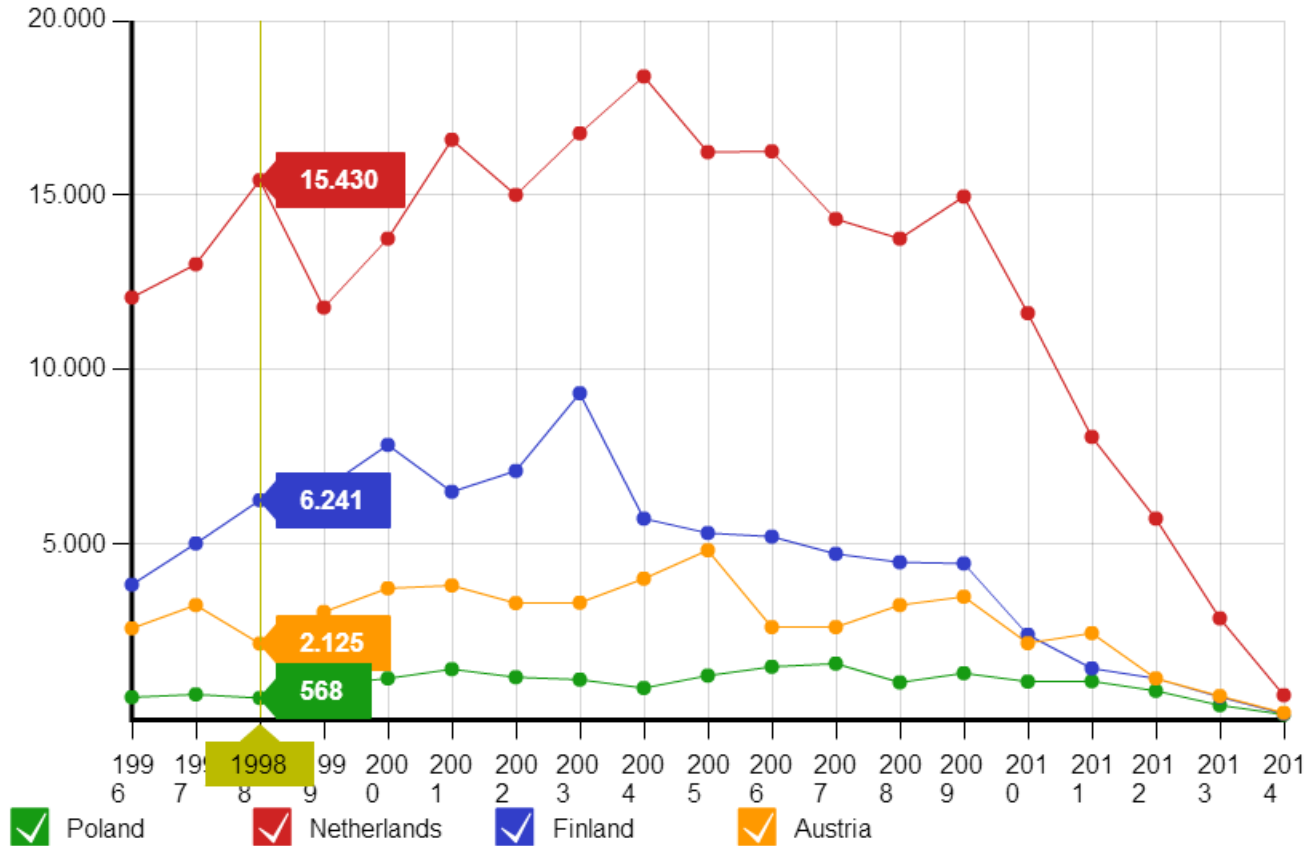
Cites, Psychology



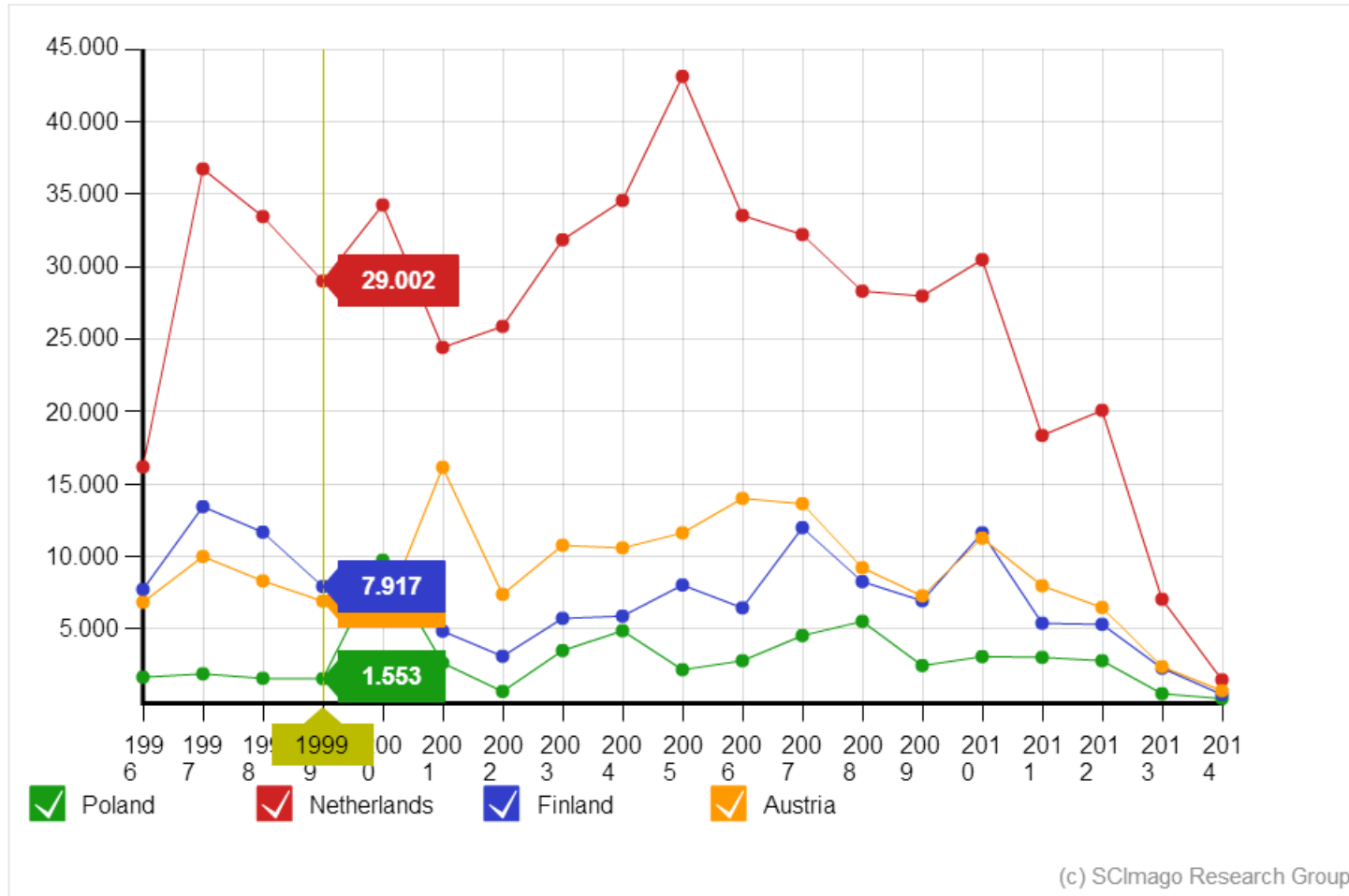
Cites, Business, Management, Accounting



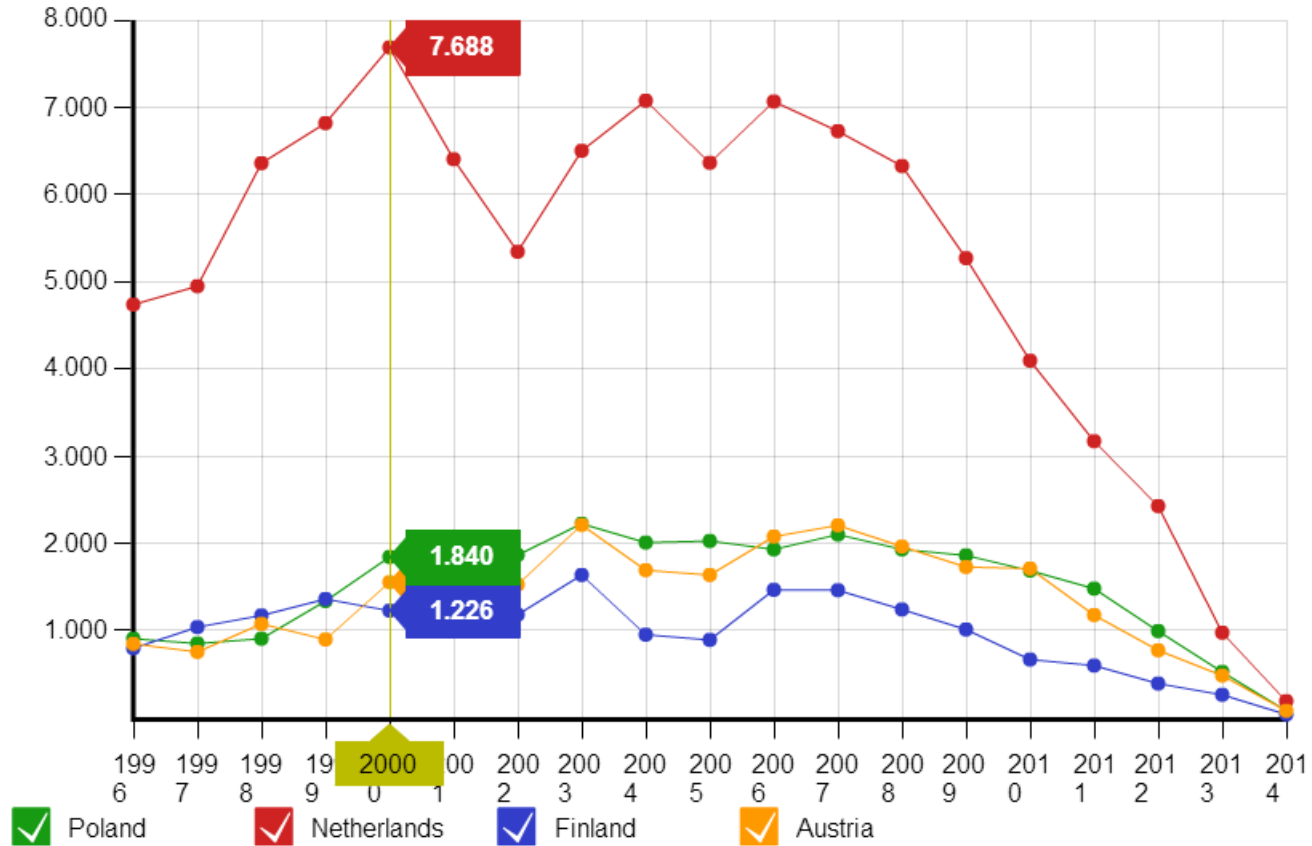
Cites, Health Professions



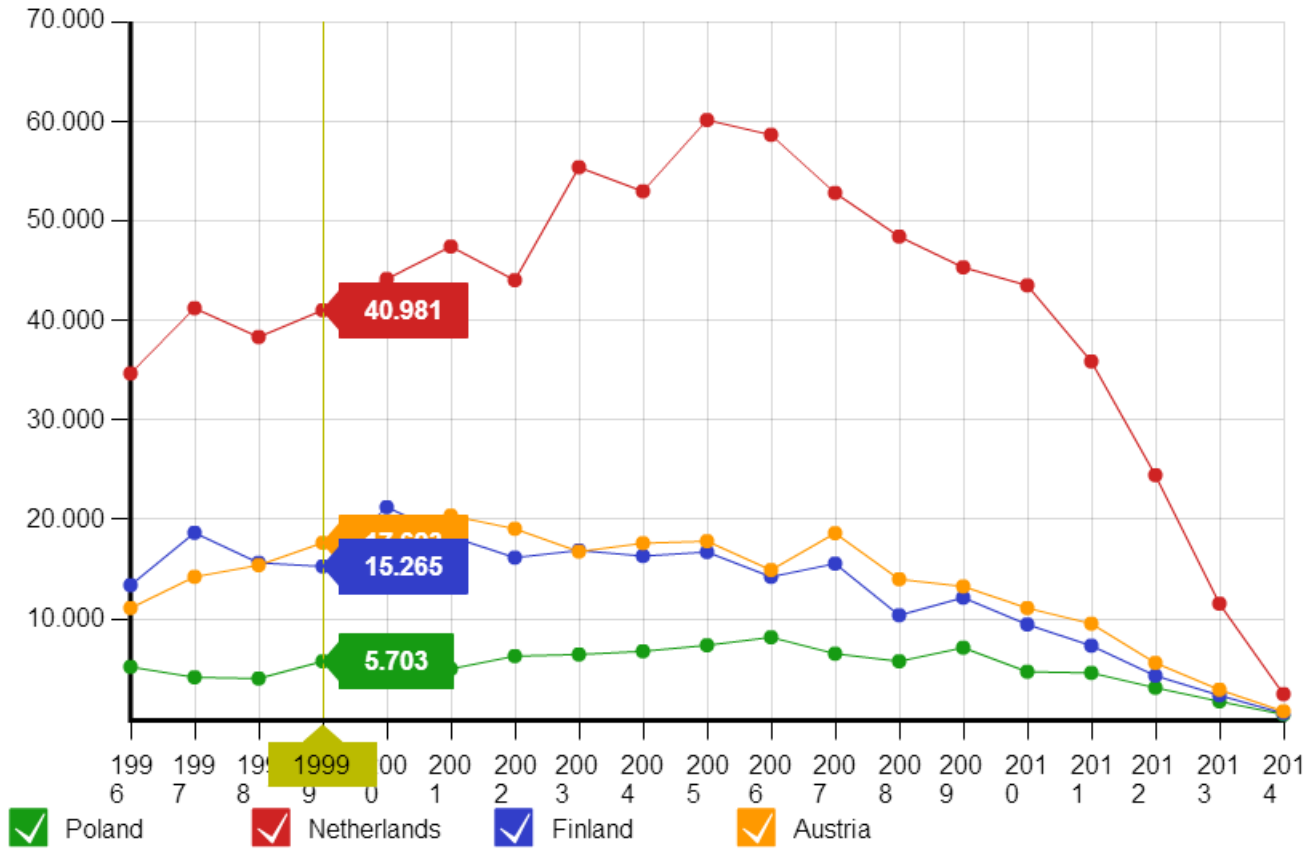
Cites, multidisciplinary (PL + NE, FI, AT)



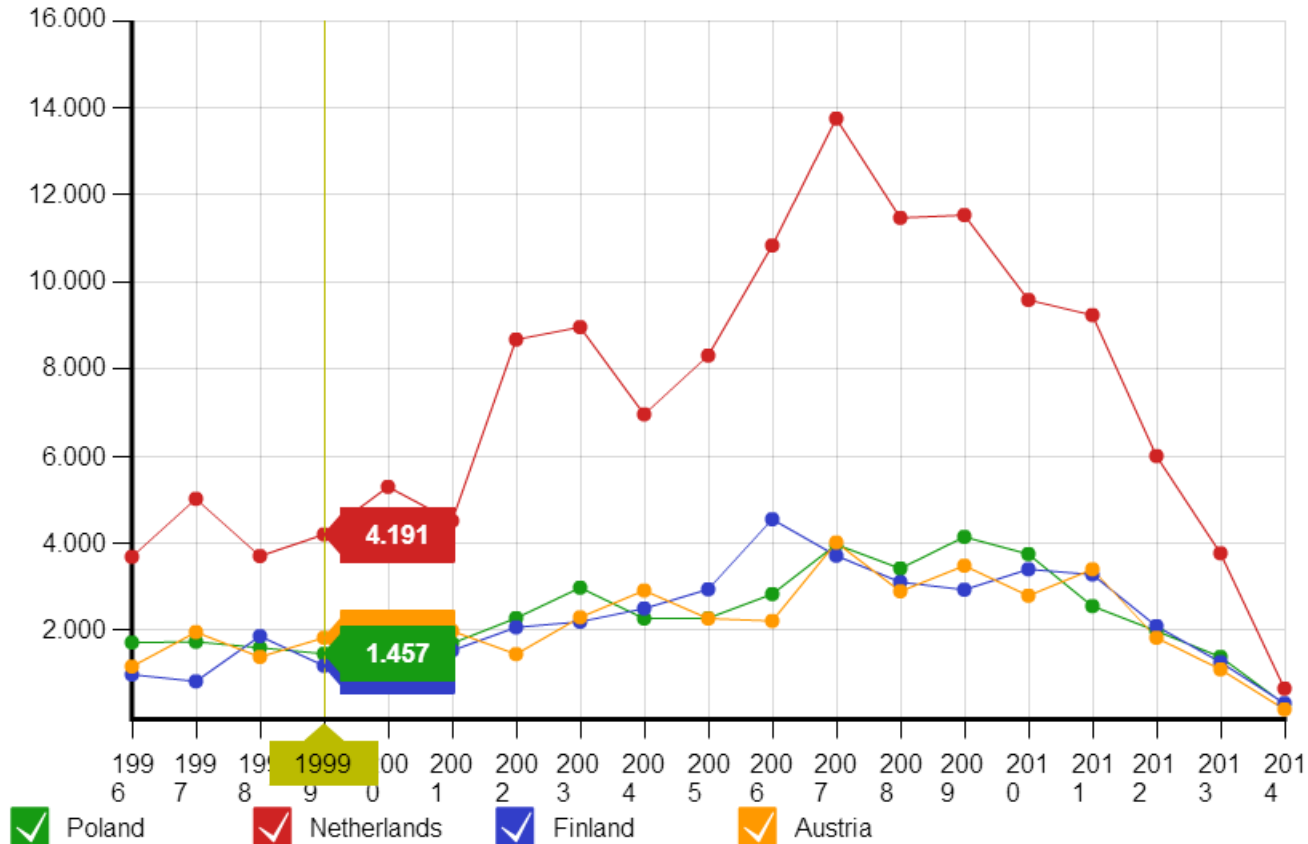
Cites, Veterinary Sciences



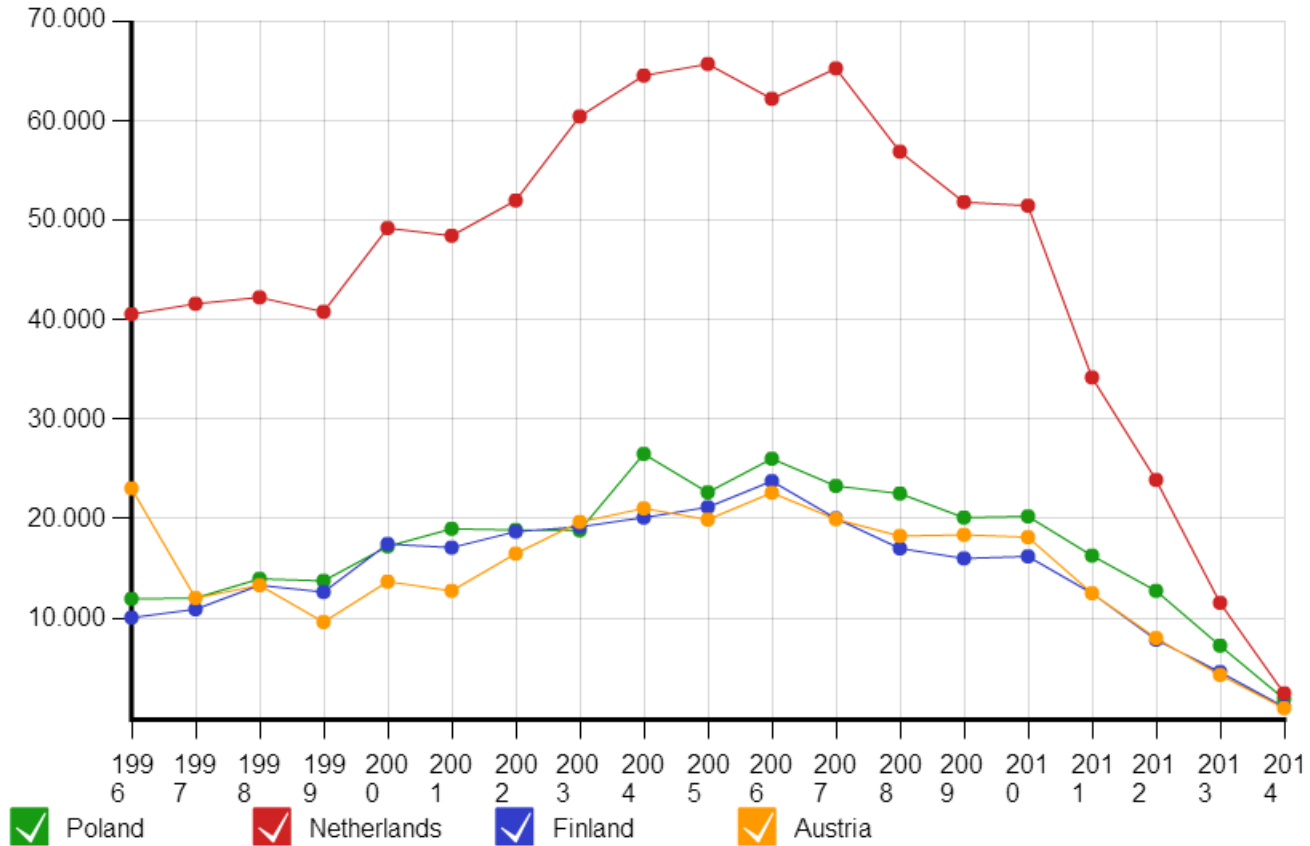
Cites, Neuroscience



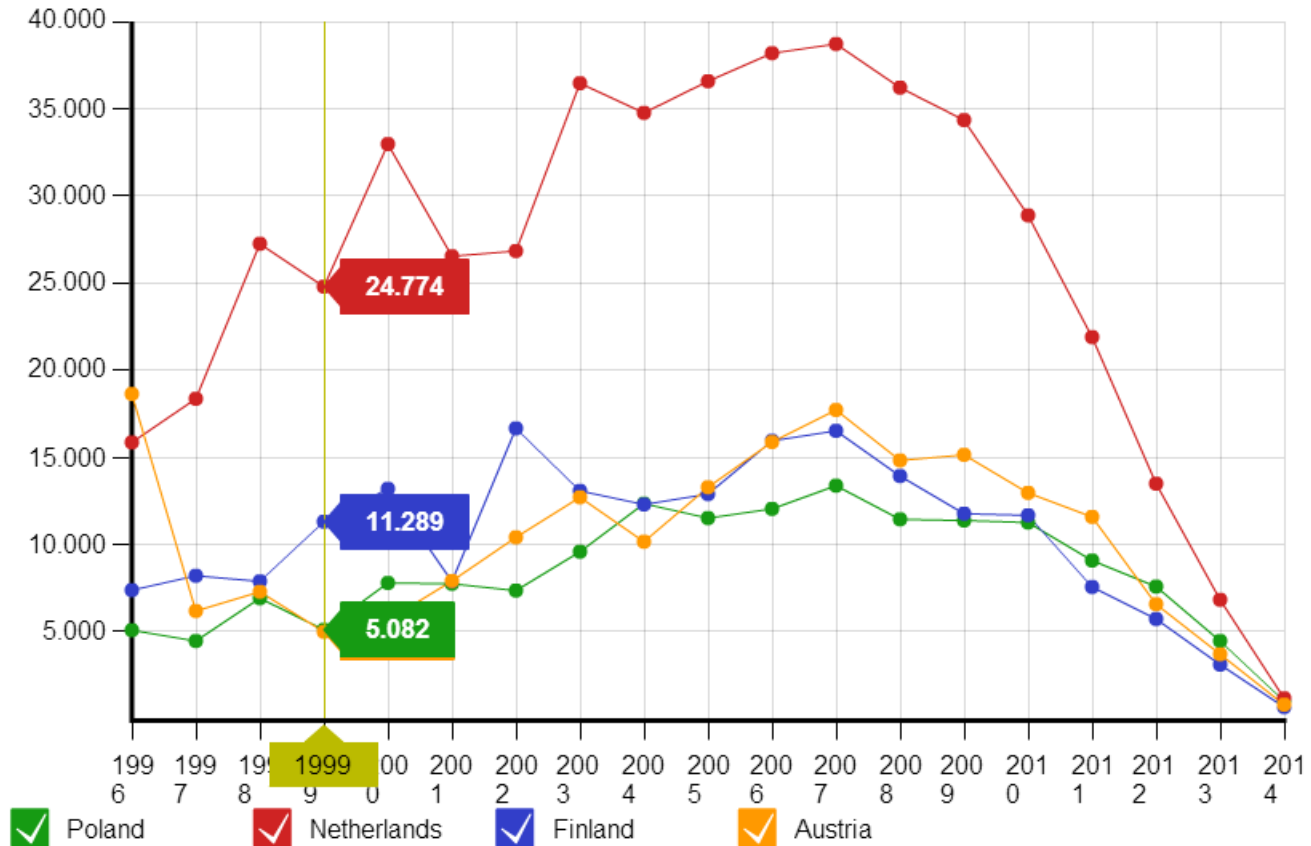
Cites, Energy



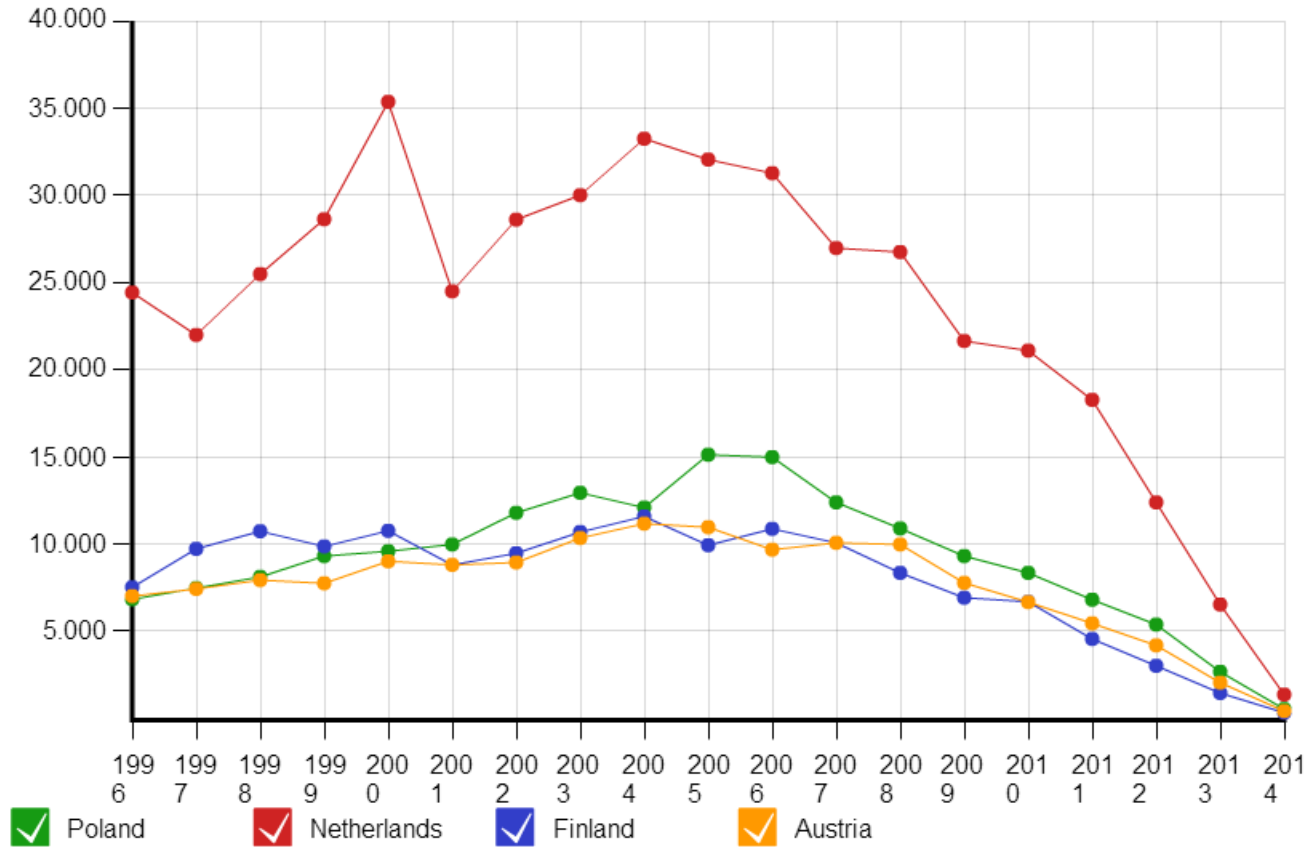
Cites, Engineering



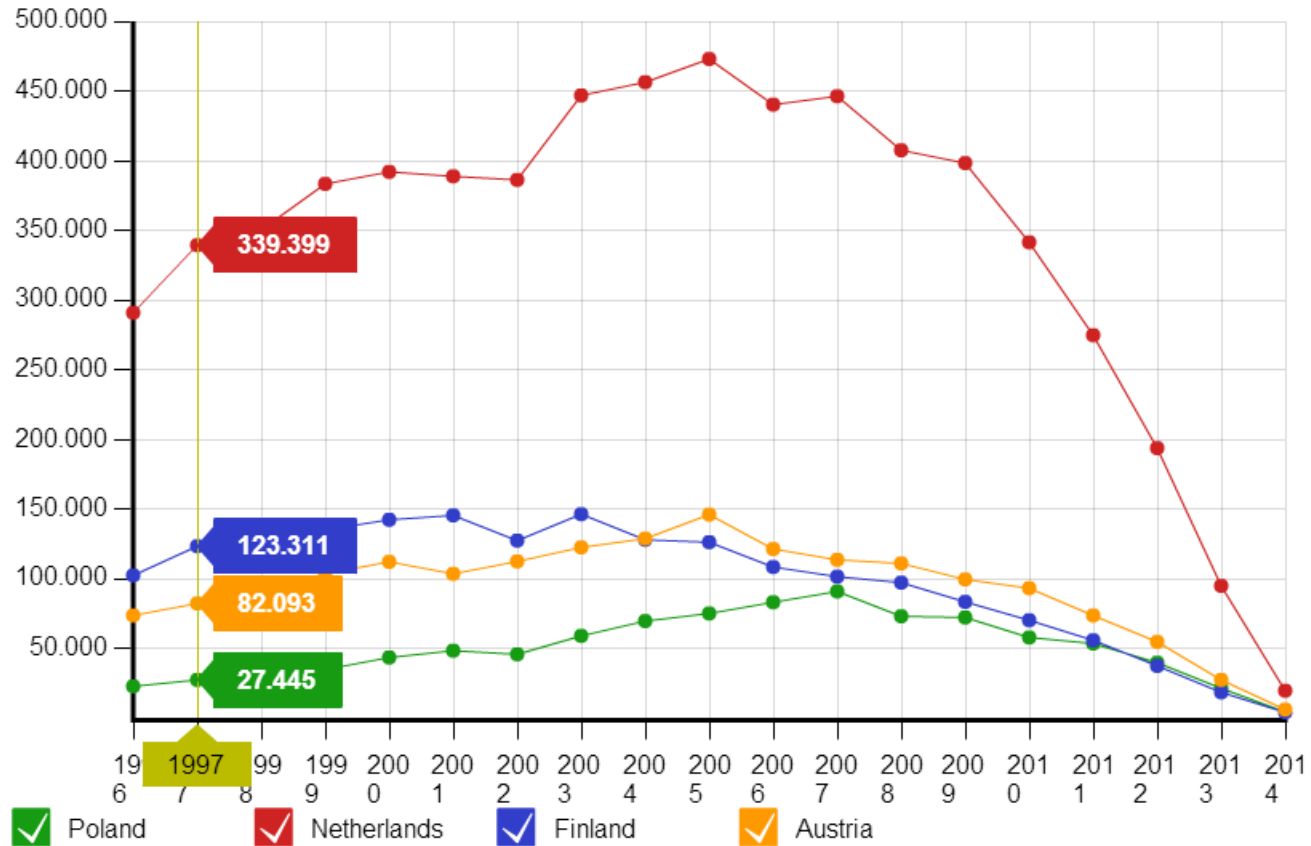
Cites, Computer Science



Cites, Pharma

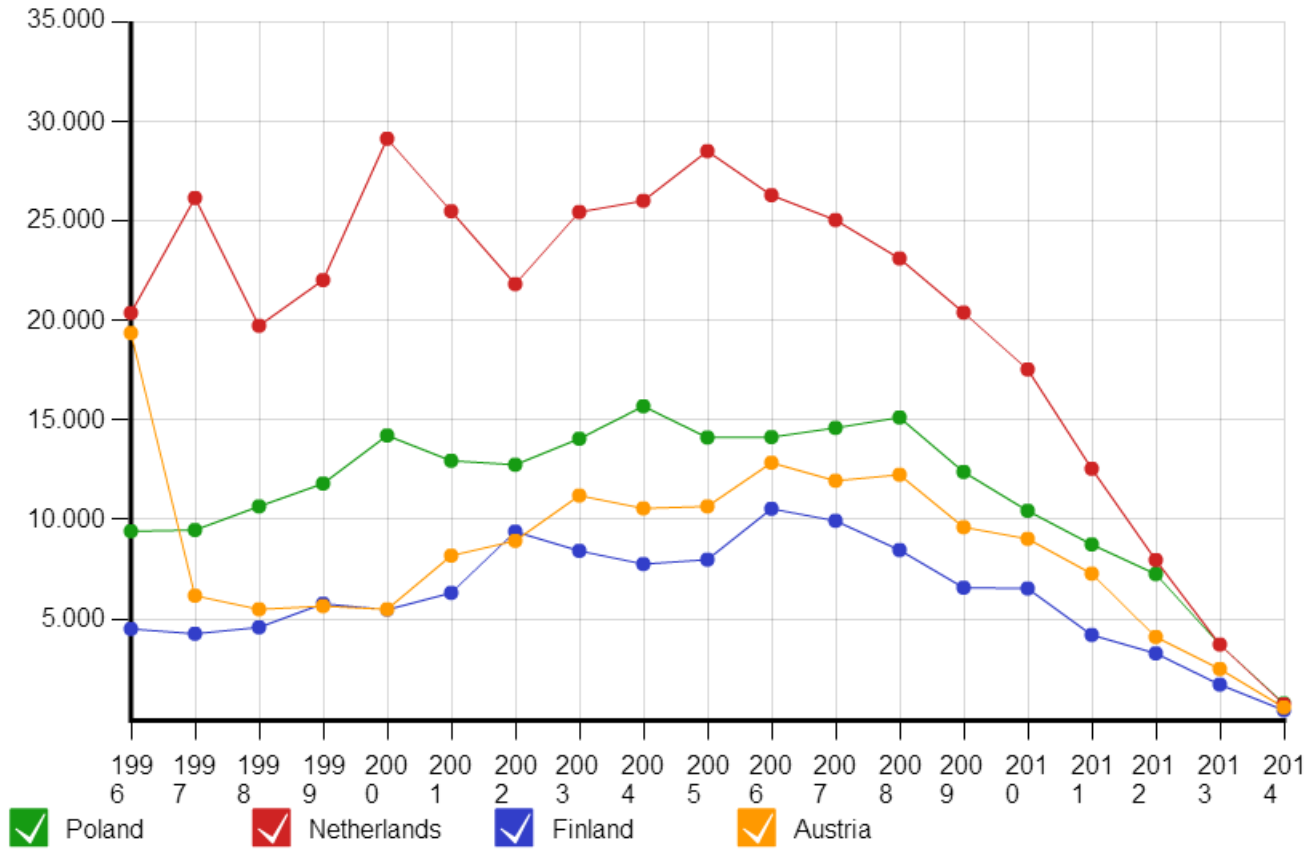


Cites, Medicine

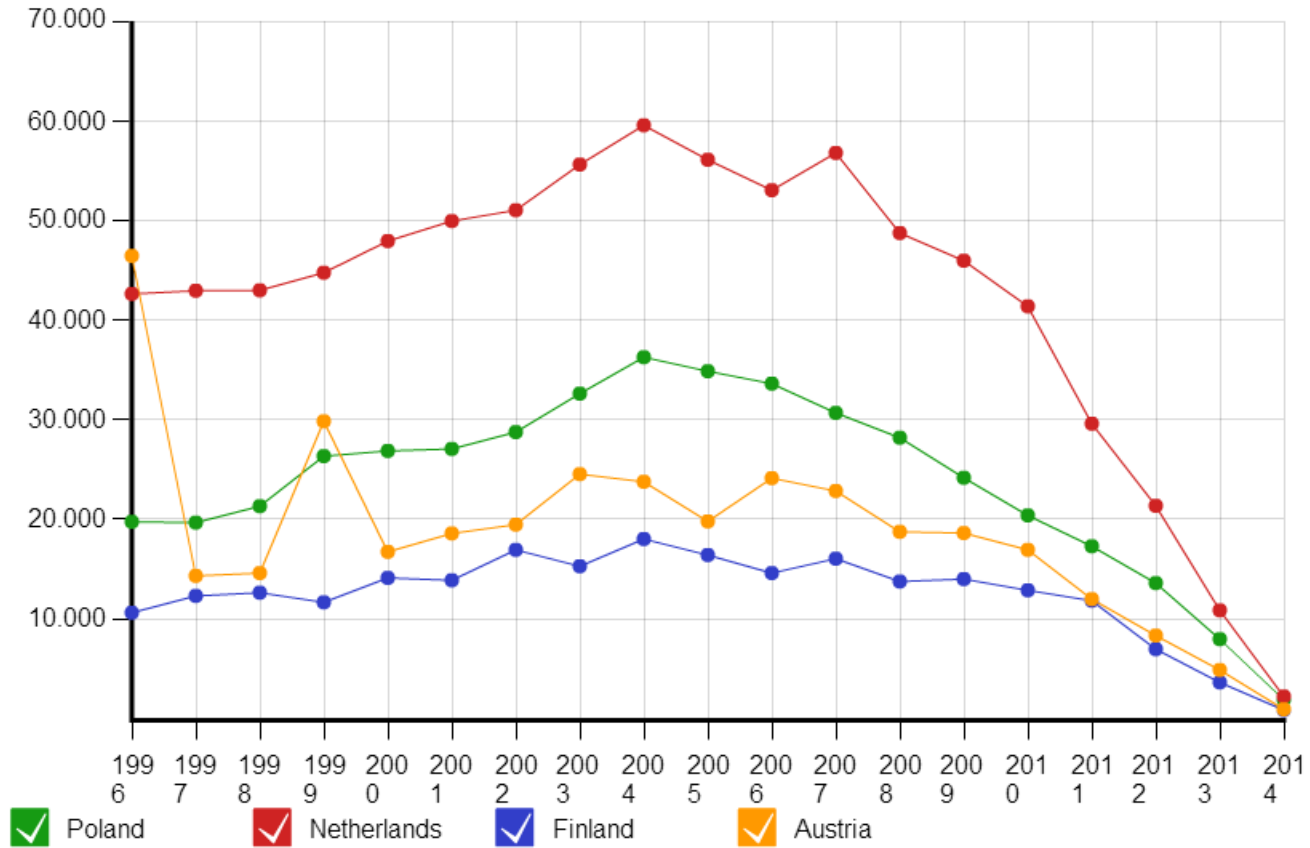


(c) SCImago Research Group

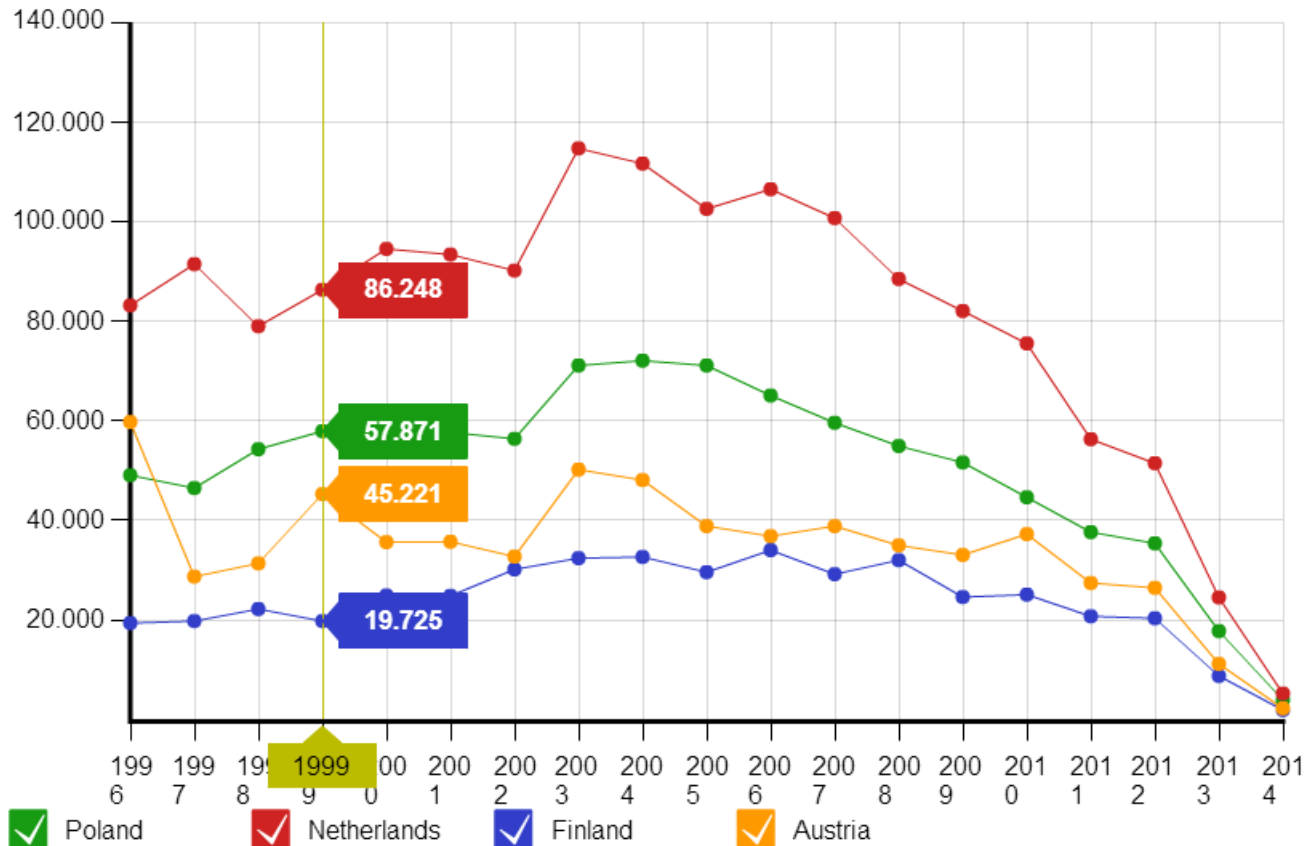
Cites, Mathematics



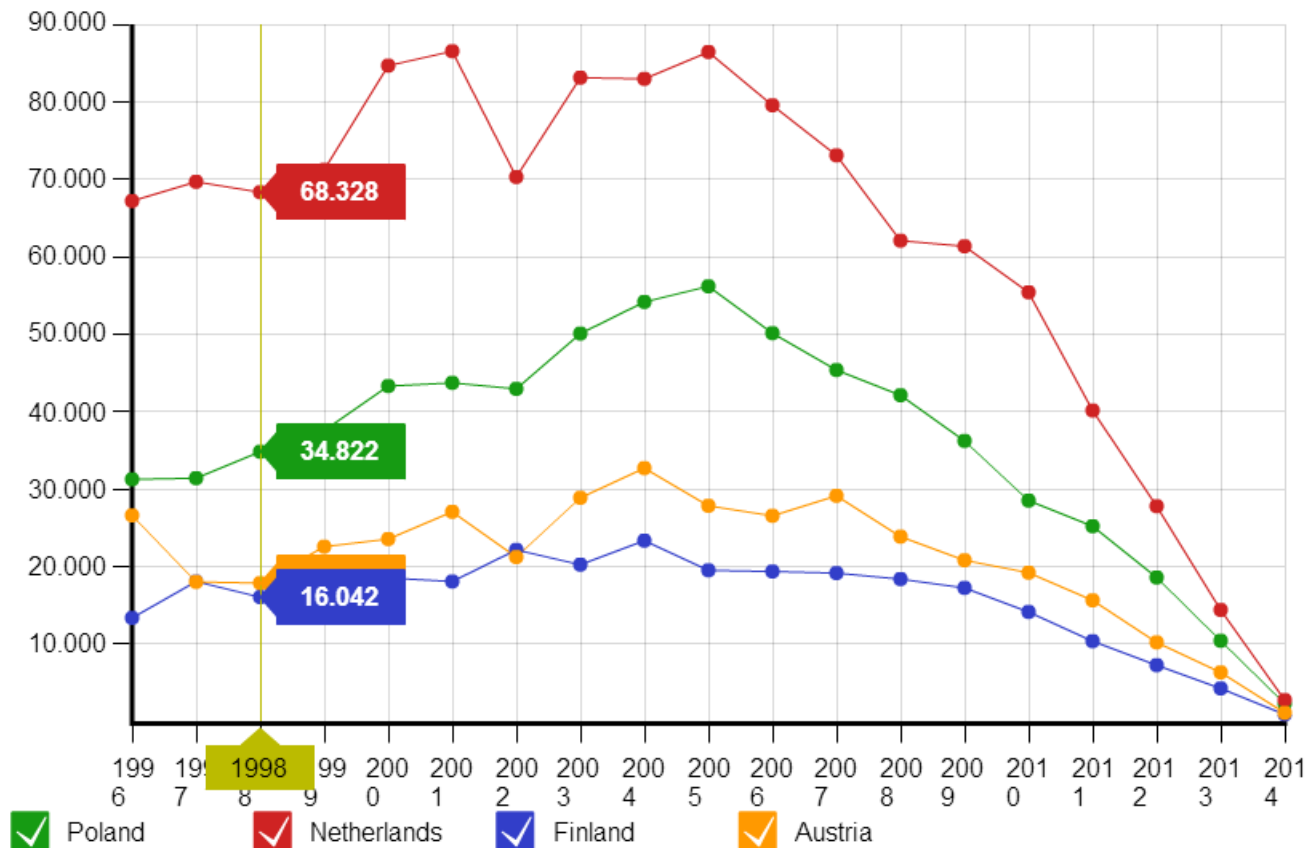
Cites, Material Science



Cites, Physics & Astronomy

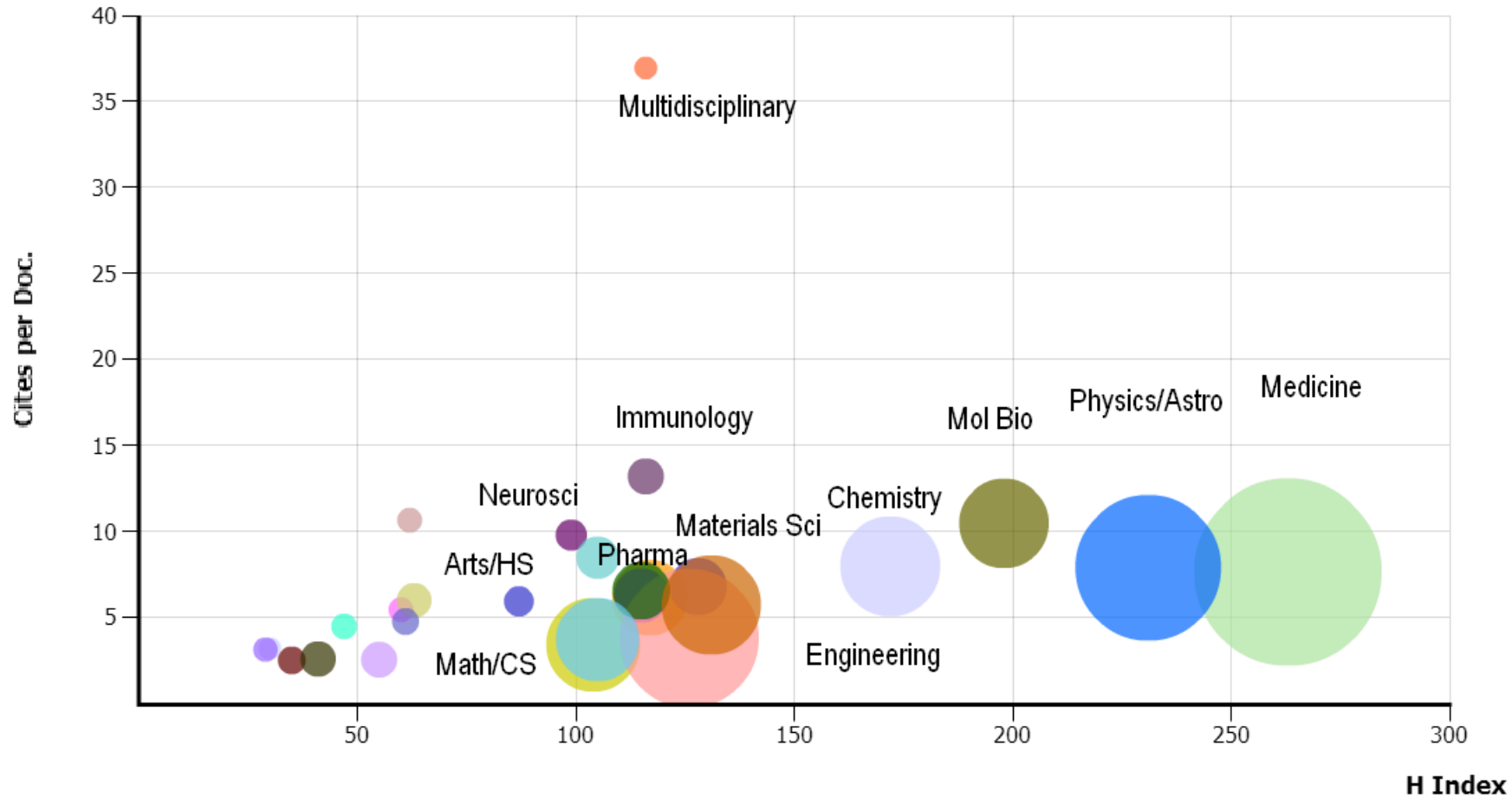


Cites, Chemistry

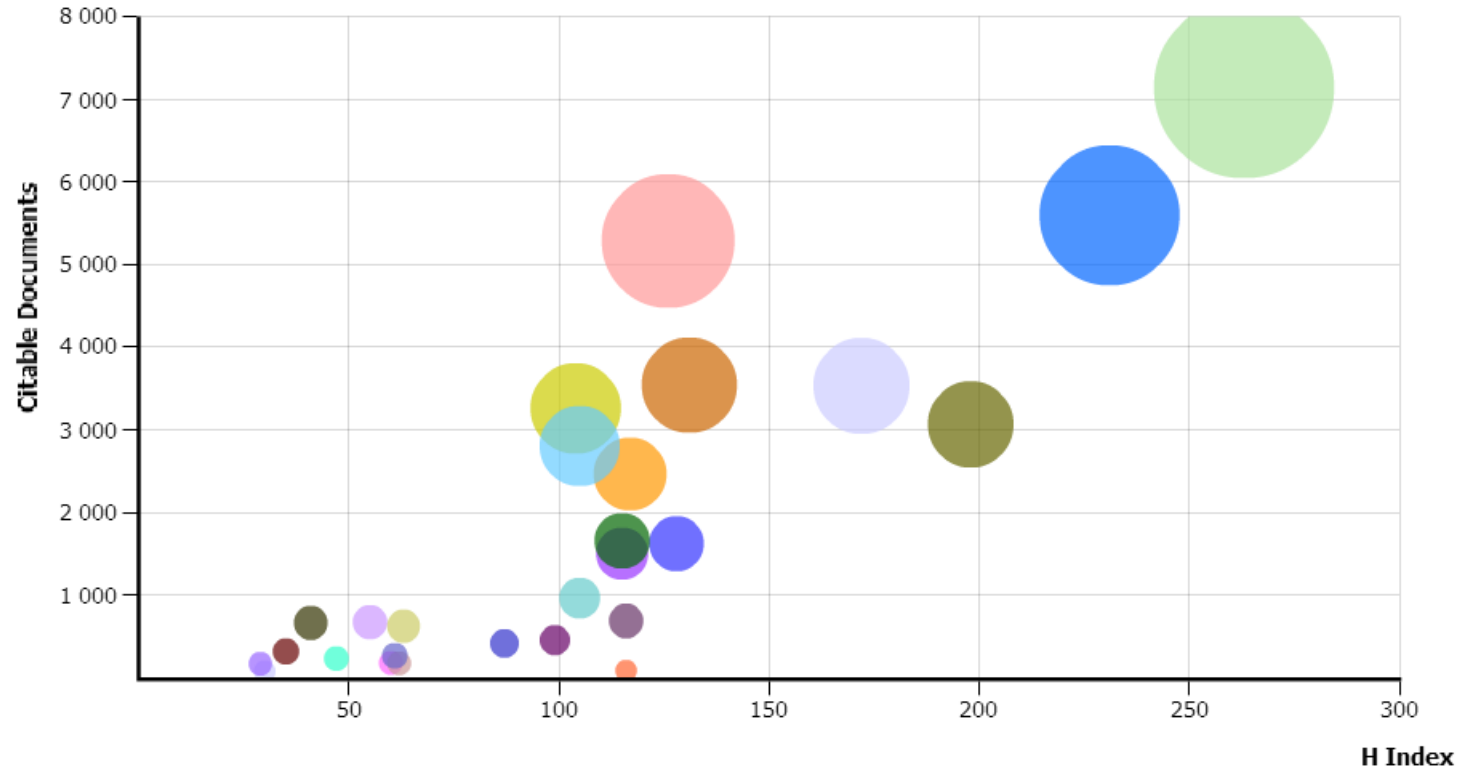


Poland 2010-11




























Medicine



Poland 2010-11



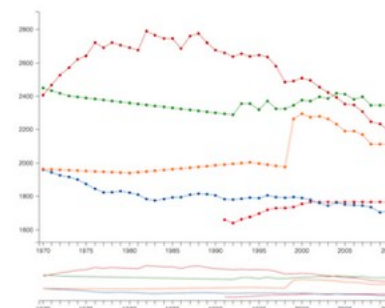
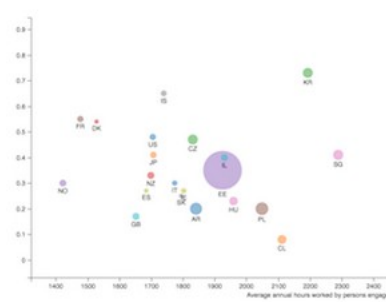
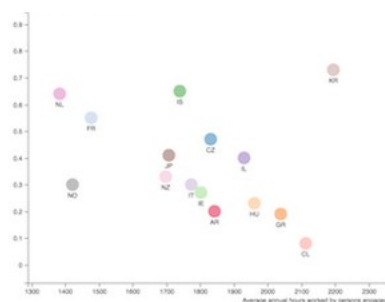
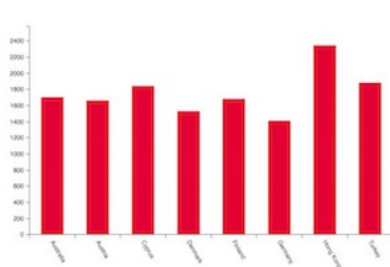
Bubble chart legend

 Agricultural and Biological Sciences	 Arts and Humanities
 Biochemistry, Genetics and Molecular Biology	 Business, Management and Accounting
 Chemical Engineering	 Chemistry
 Computer Science	 Decision Sciences
 Dentistry	 Earth and Planetary Sciences
 Economics, Econometrics and Finance	 Energy
 Engineering	 Environmental Science
 Health Professions	 Immunology and Microbiology
 Materials Science	 Mathematics
 Medicine	 Multidisciplinary
 Neuroscience	 Nursing
 Pharmacology, Toxicology and Pharmaceutics	 Physics and Astronomy
 Psychology	 Social Sciences
 Veterinary	

<http://statystyka.nauka.gov.pl>

Wskaźnik	Szczegóły	Źródło
Cytowania na dokument	Average citations to documents published.	SCIMAGO

Aby wybrać inną wizualizację, kliknij na wybraną ikonę:

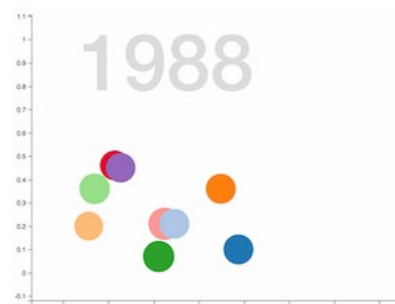
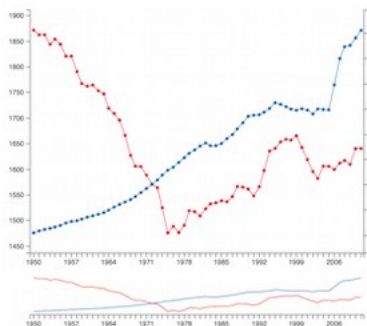


Jeden wskaźnik dla wielu krajów

Dwa wskaźniki dla wielu krajów

Trzy wskaźniki dla wielu krajów

Ewolucja wskaźnika dla wielu krajów



Ewolucja dwóch wskaźników

Trzy wskaźniki w czasie

Treemap

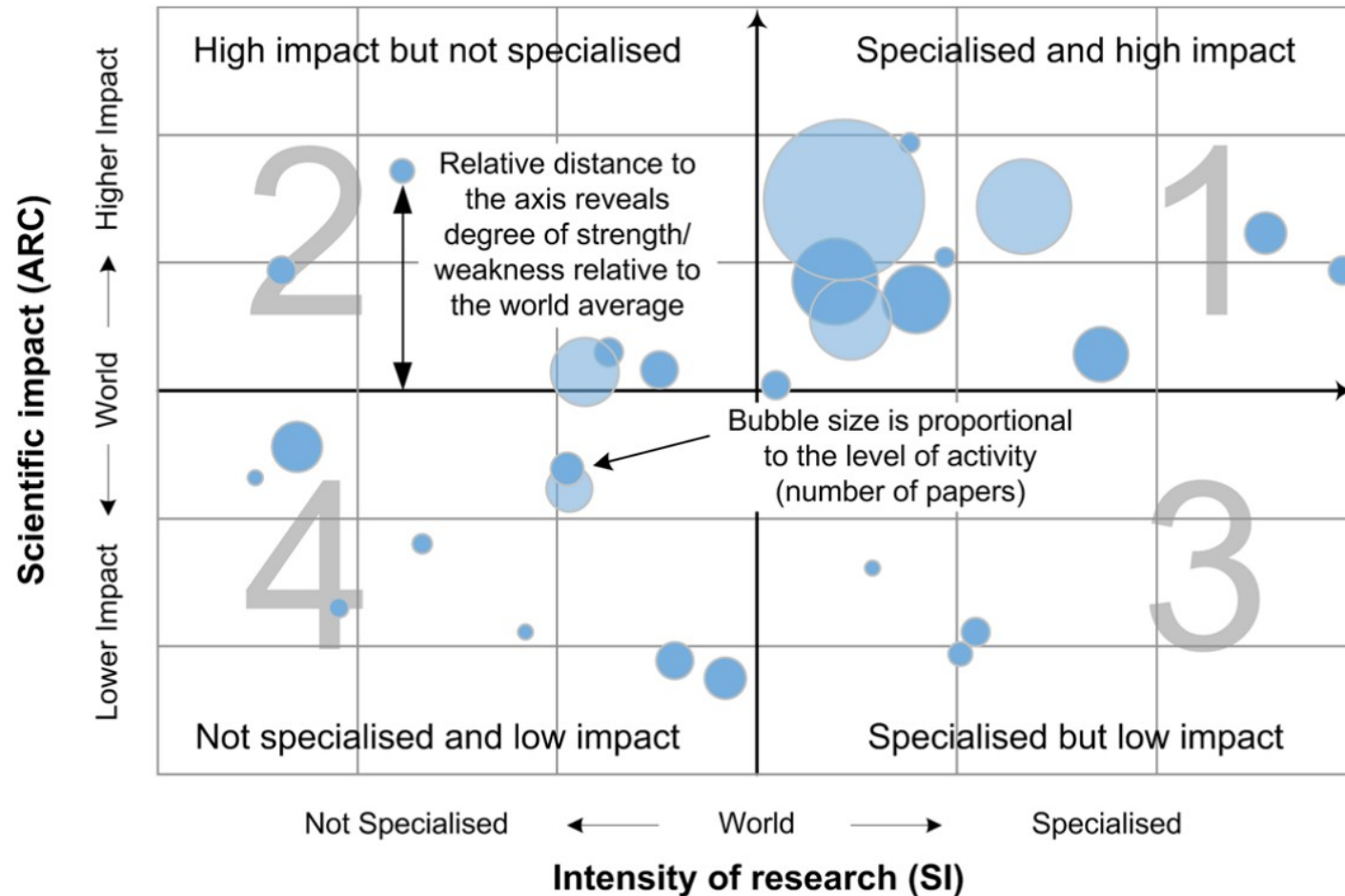
Mapy

<http://statystyka.nauka.gov.pl>

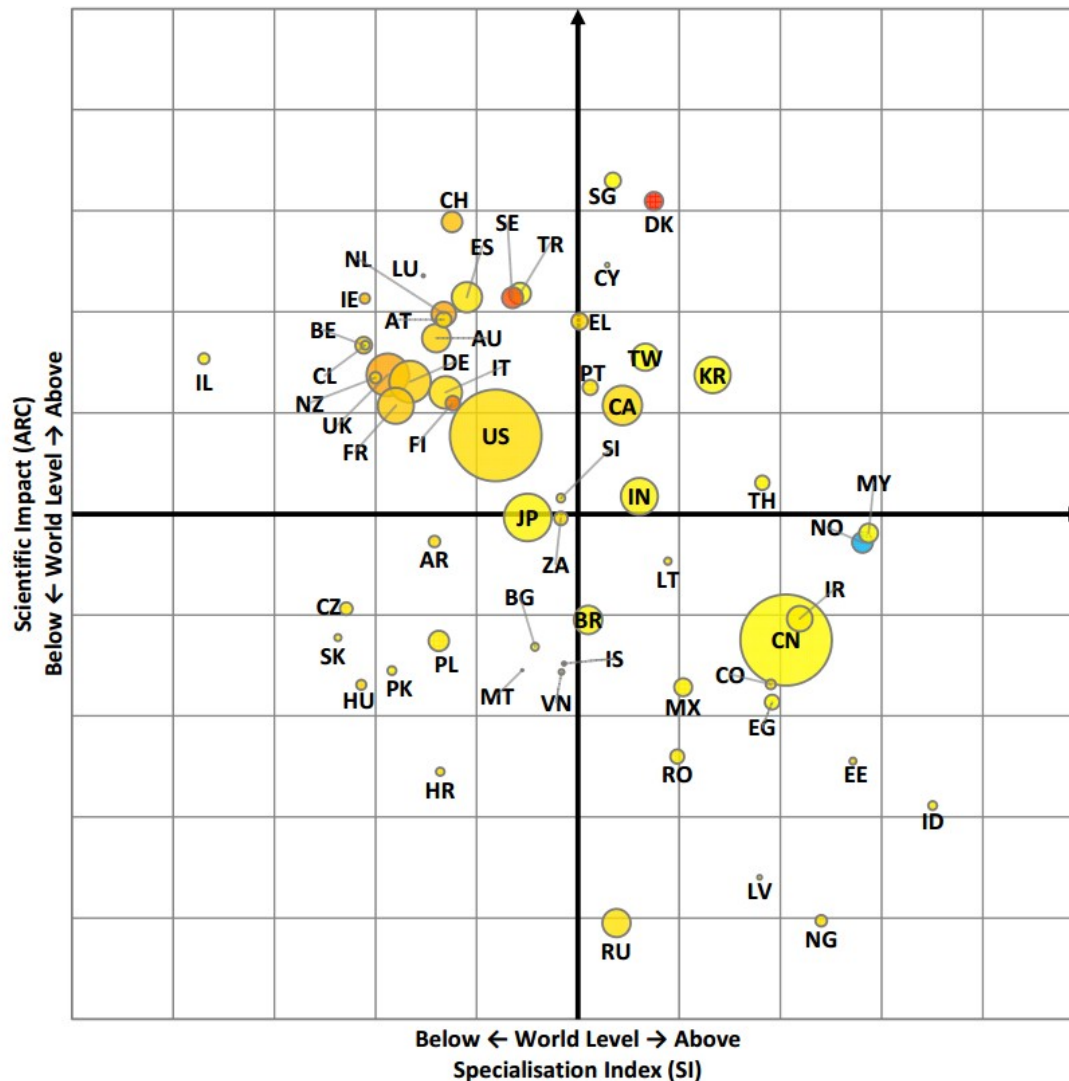


Wskaźnik	Szczegóły	Źródło
Cytowania na dokument	Average citations to documents published.	SCIMAGO

Norway International Collaboration



Norway International Collaboration



Analysis
done in 15
themes.

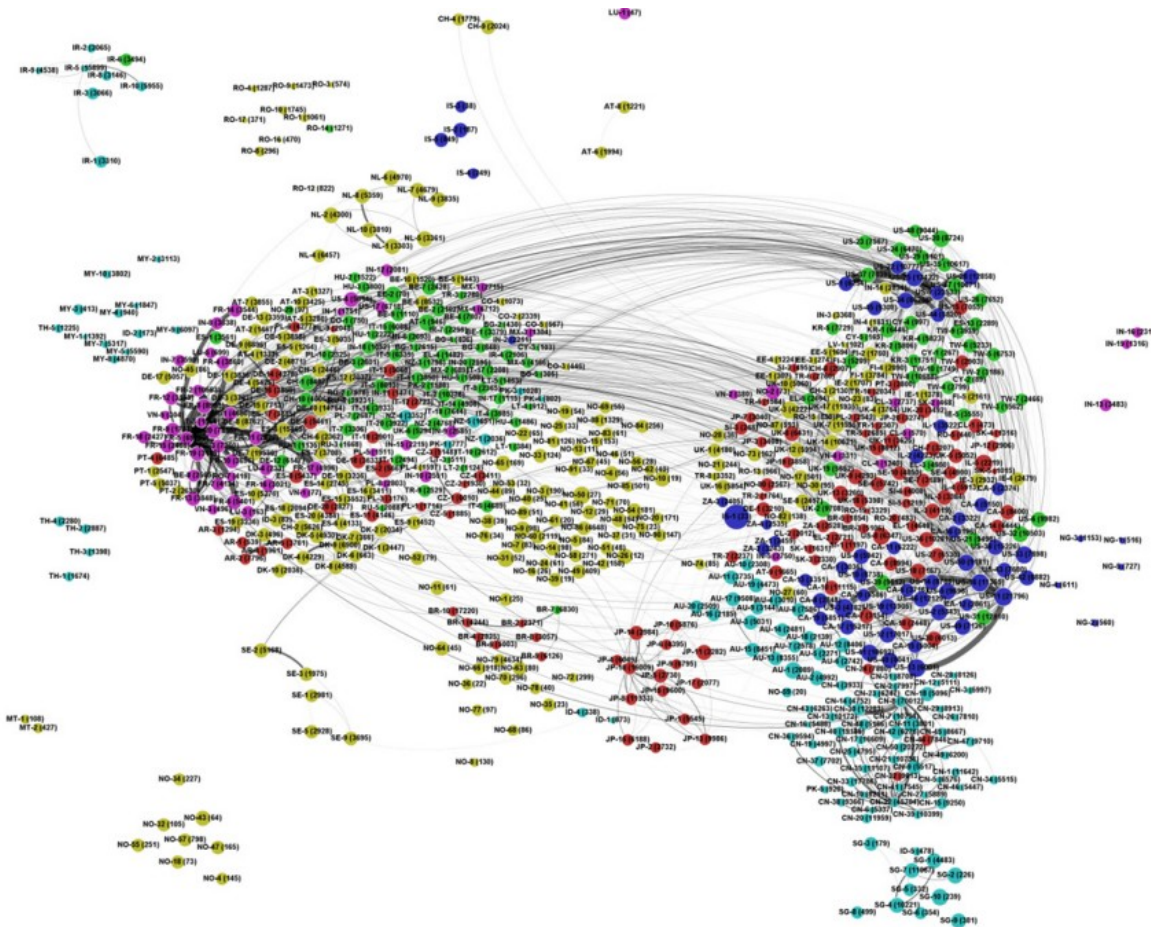
Ex: Energy

Better to use
clouds than
points.
Changes are
also noted as
shifts.

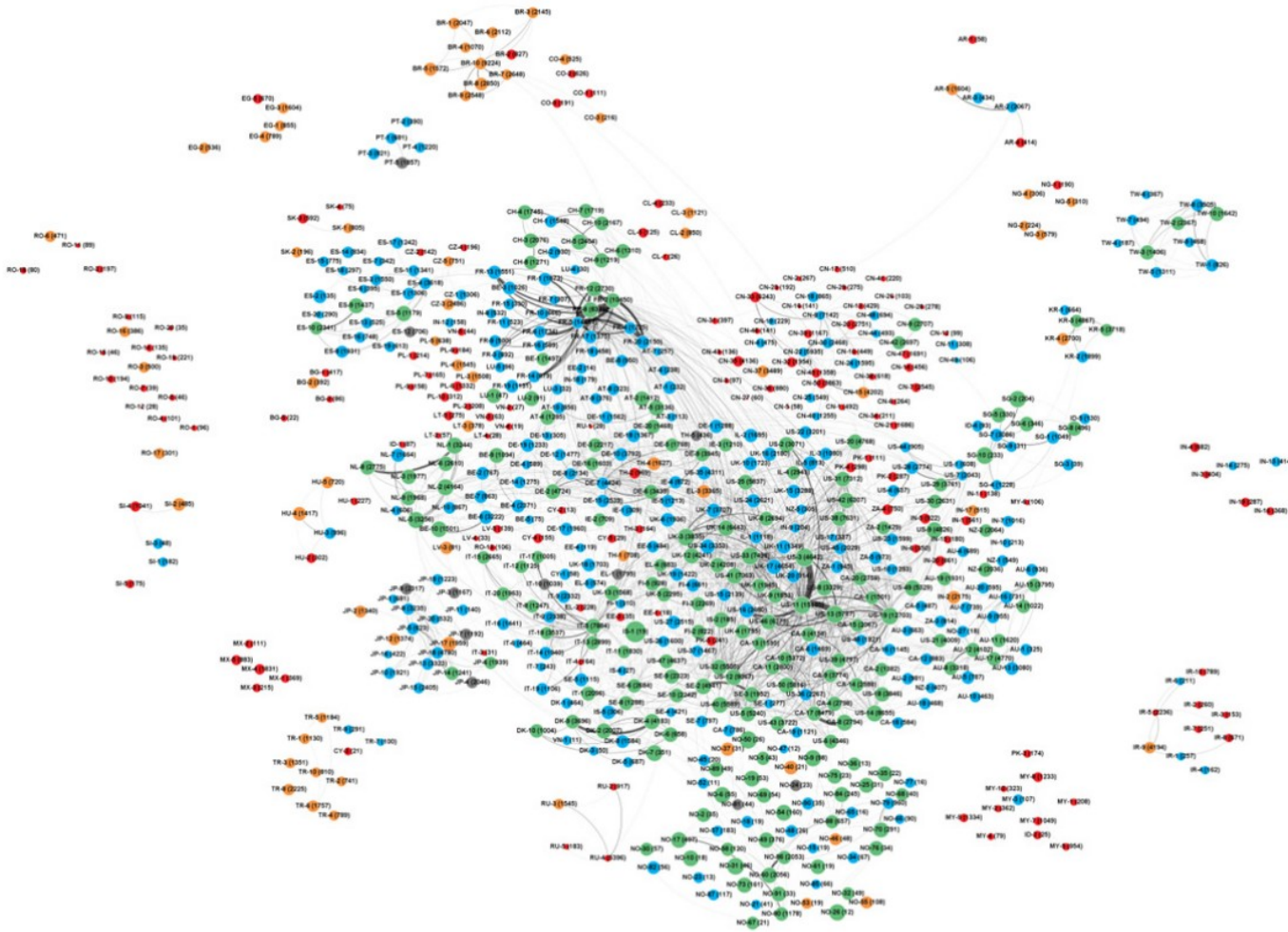
Collaboration between institutions

Ranking of organizations:
CNRS, DOE,
Helmholtz
Association,
Chinese Academy
of Sciences,
Harvard University,
CSIC, Max Planck
Society, CEA.

Based on page
rank and data from
Scopus 2010-12.

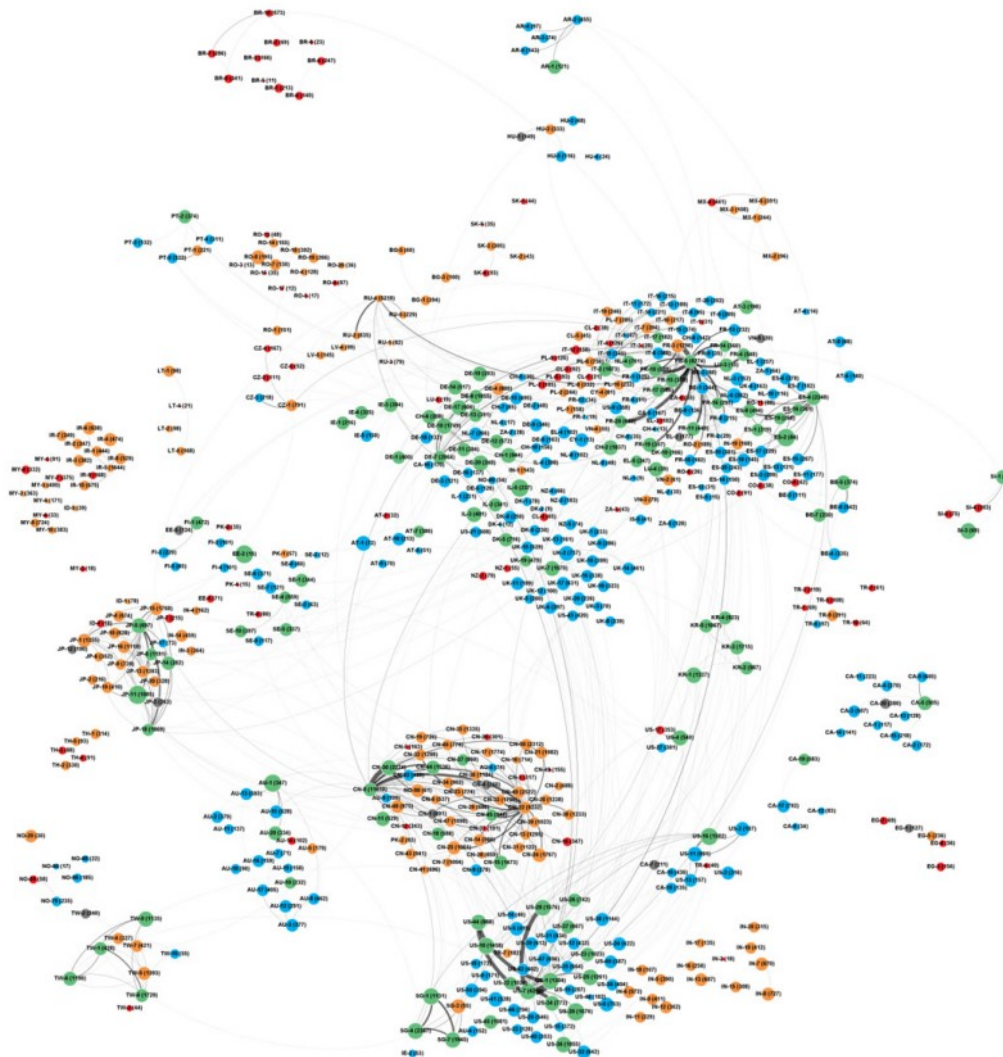


Collaboration: Health & Care



Few isolated clusters,
strong
collaboration
but little
competition.

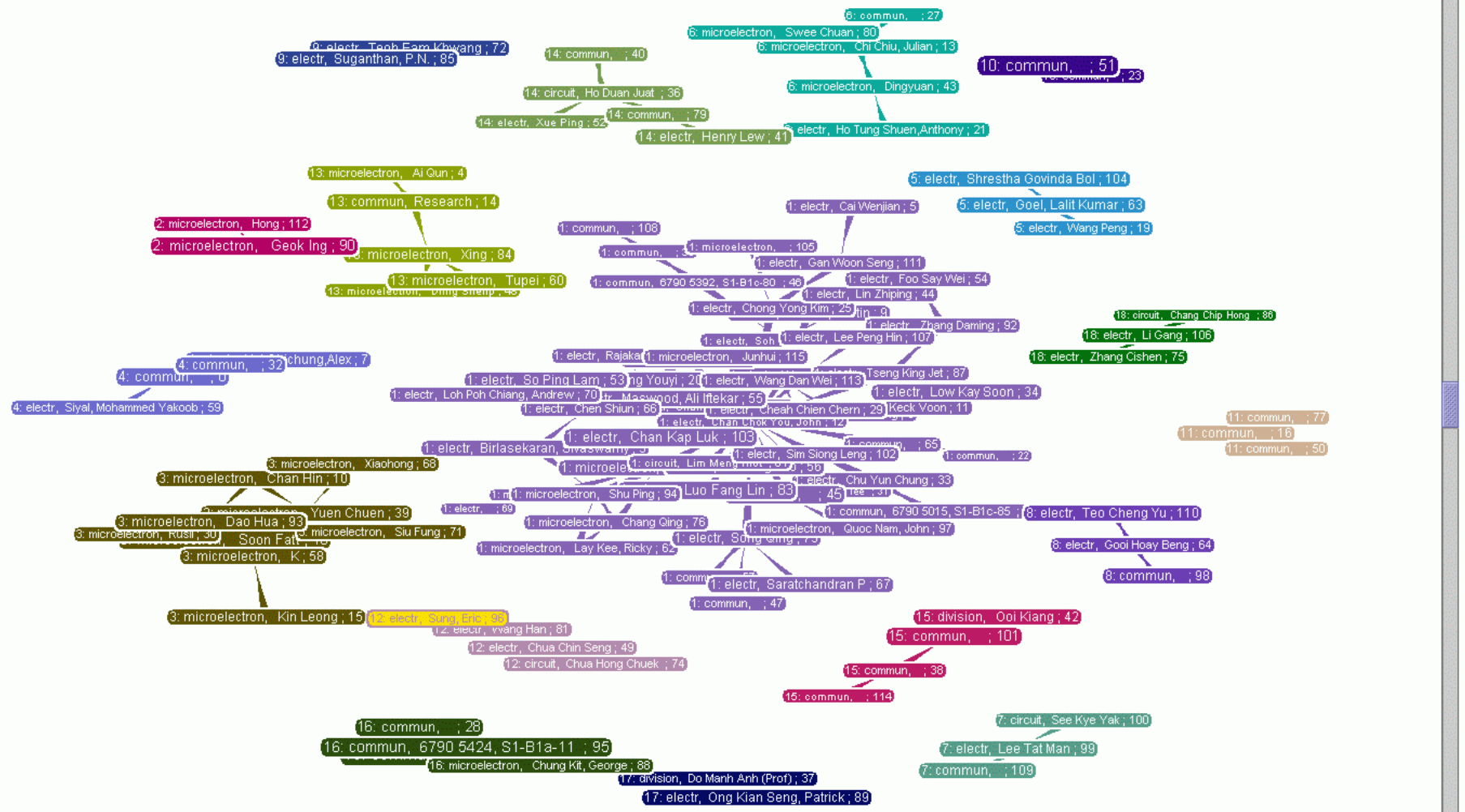
Collaboration: Nanotech, New Materials



Large EU
collaboration,
several national
collaborations,
many clusters,
strong competition.
5 colors,
depending on
impact vs.
specialization.

Who shares my interest?

- Finding all people who share similar interests in large organizations or worldwide is difficult (my own experience).
- Each individual may have many different interests so the search process should be topic-oriented, not people-oriented.
- The process should be automatic – use info on people's homepages and their lists of publications.
- Visualize relations using graphs with individuals as nodes and different type of relations as edges.
- The structure of the graphical representation depends strongly on the selection of key entities of the nodes – text should be projected first on domain ontology.





Thank you for your attention.

Prof. Włodzisław Duch
Under-Secretary of State
Ministry of Science and Higher Education

e-mail: sekretariat.mwd@nauka.gov.pl

Just give a chance to
all people of the World!

And don't forget about
aliens!

Open your stuff!

Google: W. Duch => Papers/presentations/projects

