

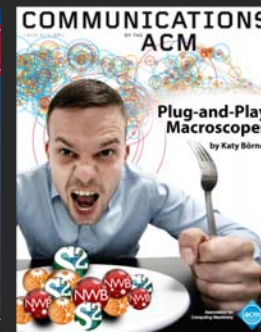
Mining, Mapping, and Accelerating Science and Technology

Katy Börner

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Information Visualization Laboratory, Director
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katy@indiana.edu



With special thanks to the members at the Cyberinfrastructure for Network Science Center; the Sci2, NWB, and EpiC team; and the VIVO Collaboration

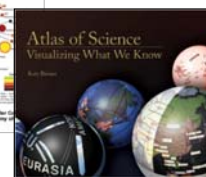


*iSchool Faculty Lecture
University of Pittsburgh
Pittsburgh, PA*

November 10, 2011

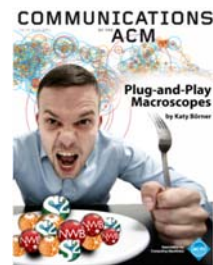
Overview

1. **Data mining and visualization research** that aims to increase our scientific understanding of the structure and dynamics of science and technology.
2. **Novel approaches and services** that improve information access, researcher networking, and research management.
3. **Data services and plug-and-play macroscope tools** that commoditize data mining and visualization.



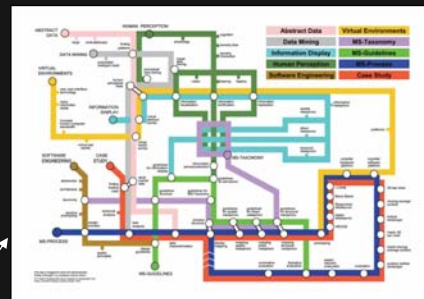
Overview

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Take terra bytes of data

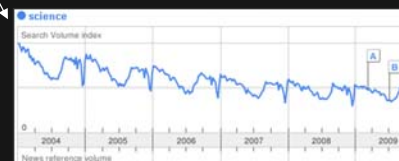
Descriptive &
Predictive
Models



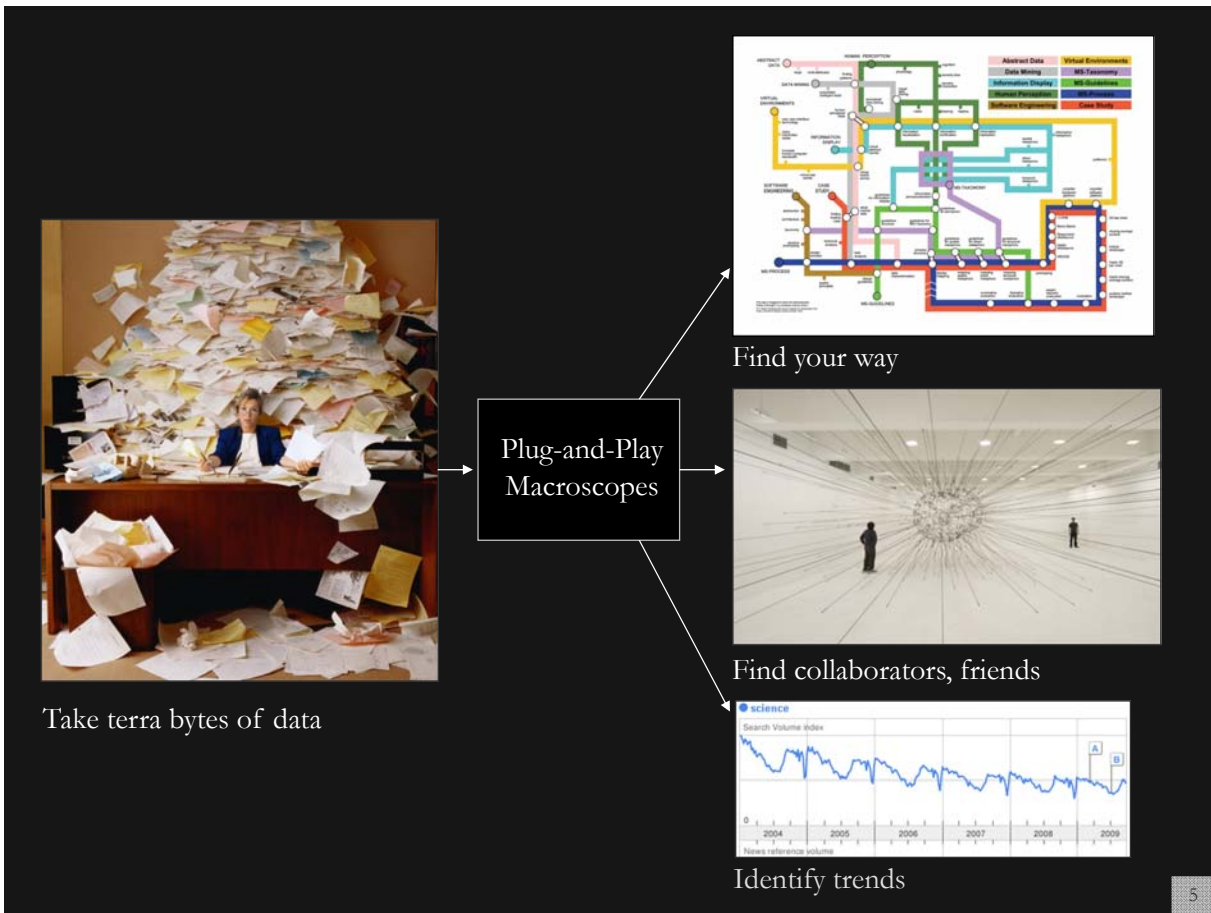
Find your way



Find collaborators, friends



Identify trends



Type of Analysis vs. Level of Analysis

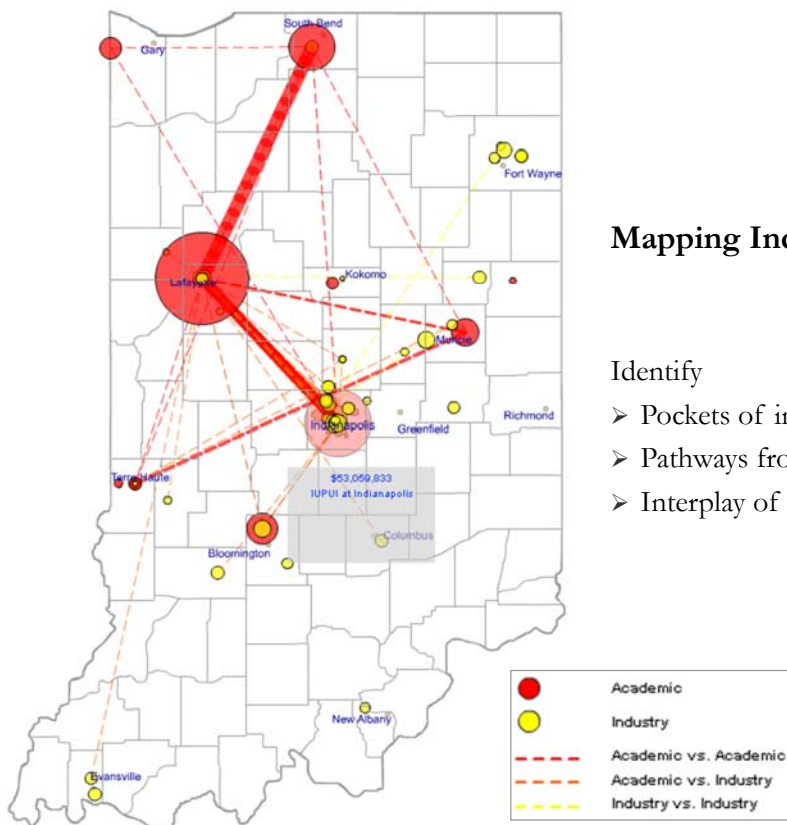
	<i>Micro/Individual (1-100 records)</i>	<i>Meso/Local (101-10,000 records)</i>	<i>Macro/Global (10,000 < records)</i>
Statistical Analysis/Profiling	Individual person and their expertise profiles	Larger labs, centers, universities, research domains, or states	All of NSF, all of USA, all of science.
Temporal Analysis (When)	Funding portfolio of one individual	Mapping topic bursts in 20-years of PNAS	113 Years of Physics Research
Geospatial Analysis (Where)	Career trajectory of one individual	Mapping a states intellectual landscape	PNAS publications
Topical Analysis (What)	Base knowledge from which one grant draws.	Knowledge flows in Chemistry research	VxOrd/Topic maps of NIH funding
Network Analysis (With Whom?)	NSF Co-PI network of one individual	Co-author network	NIH's core competency

Type of Analysis vs. Level of Analysis

	<i>Micro/Individual</i> (1-100 records)	<i>Meso/Local</i> (101-10,000 records)	<i>Macro/Global</i> (10,000 < records)
Statistical Analysis/Profiling	Individual person and their expertise profiles	Larger labs, centers, universities, research domains, or states	All of NSI, SA, all of sci
Temporal Analysis (When)	Funding portfolio of one individual	Public bursts of PNAS	113 Years of P Research
Geospatial Analysis (Where)	Career trajectory of one individual	Wrapping a s intellectual l	PNAS
Topical Analysis (What)		research	VxOrd/Topic r NIH funding
Network Analysis (With Whom?)	NSI work of one	work	NIH's cy



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Mapping Indiana's Intellectual Space

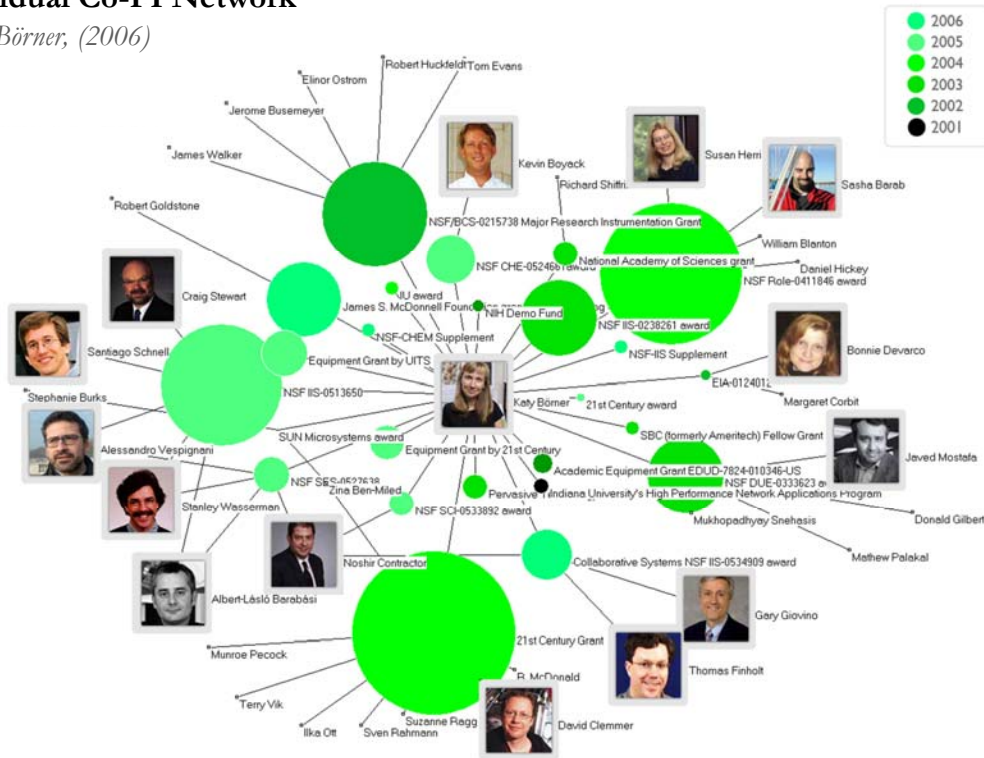
Identify

- Pockets of innovation
- Pathways from ideas to products
- Interplay of industry and academia

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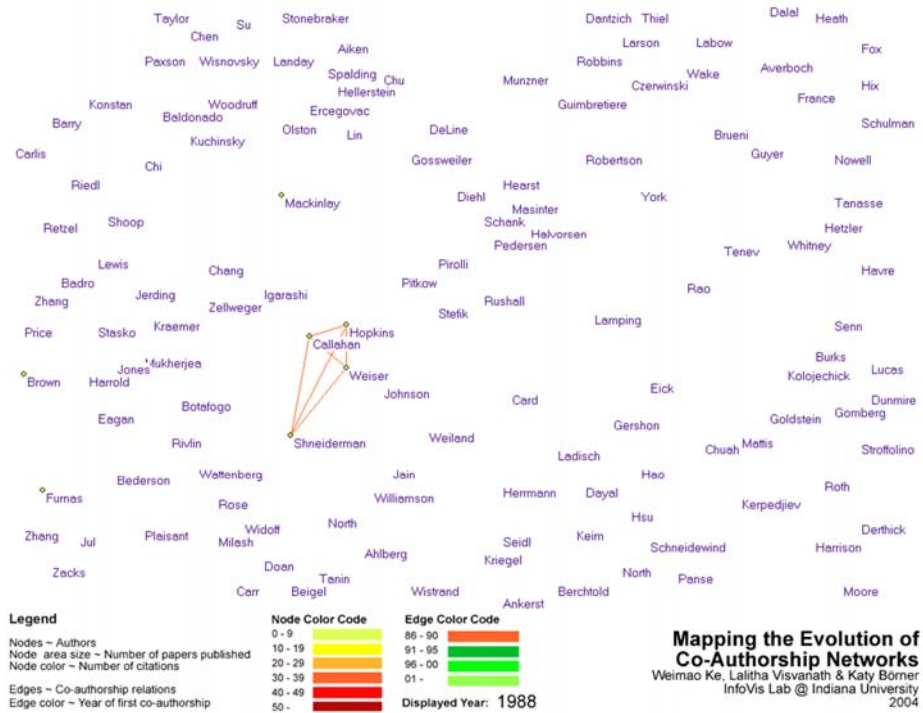
Individual Co-PI Network

Ke & Börner, (2006)



Mapping the Evolution of Co-Authorship Networks

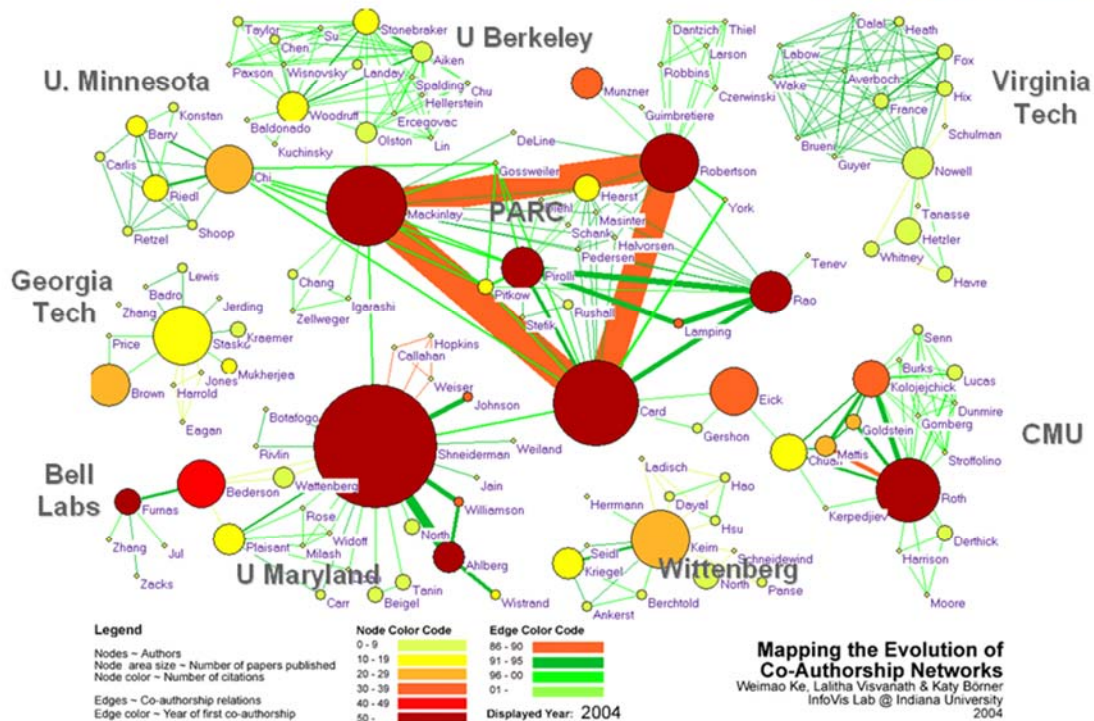
Ke, Visvanath & Börner, (2004) Won 1st price at the IEEE InfoVis Contest.



Mapping the Evolution of Co-Authorship Networks
 Weimao Ke, Lalitha Visvanath & Katy Börner
 InfoVis Lab @ Indiana University
 2004

Mapping the Evolution of Co-Authorship Networks

Ke, Viswanath & Börner, (2004) Won 1st price at the IEEE InfoVis Contest



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Studying the Emerging Global Brain: Analyzing and Visualizing the Impact of Co-Authorship Teams

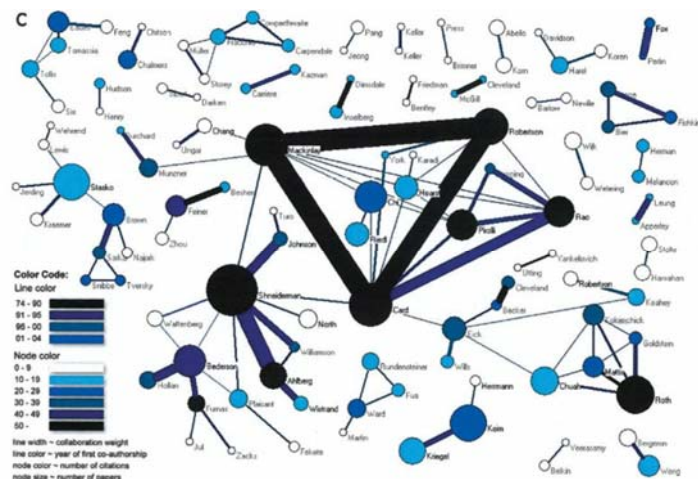
Börner, Dall'Asta, Ke & Vespignani (2005)
Complexity, 10(4):58-67.

Research question:

- Is science driven by prolific single experts or by high-impact co-authorship teams?

Contributions:

- New approach to allocate citational credit.
- Novel weighted graph representation.
- Visualization of the growth of weighted co-author network.
- Centrality measures to identify author impact.
- Global statistical analysis of paper production and citations in correlation with co-authorship team size over time.
- Local, author-centered entropy measure.



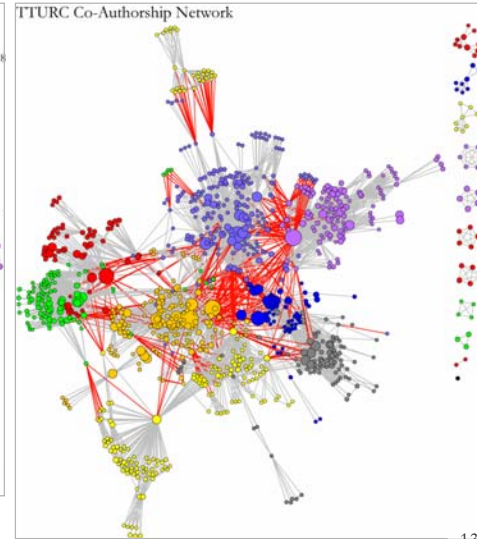
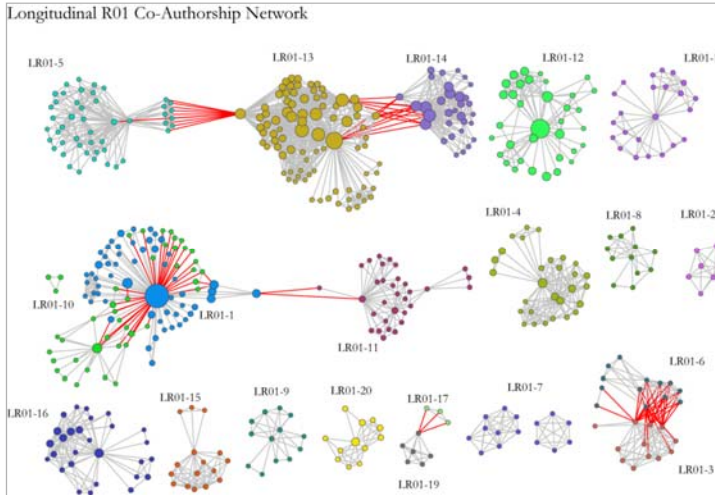
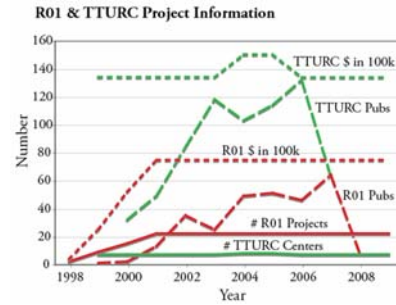
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Mapping Transdisciplinary Tobacco Use Research Centers Publications

Compare R01 investigator based funding with TTURC Center awards in terms of number of publications and evolving co-author networks.

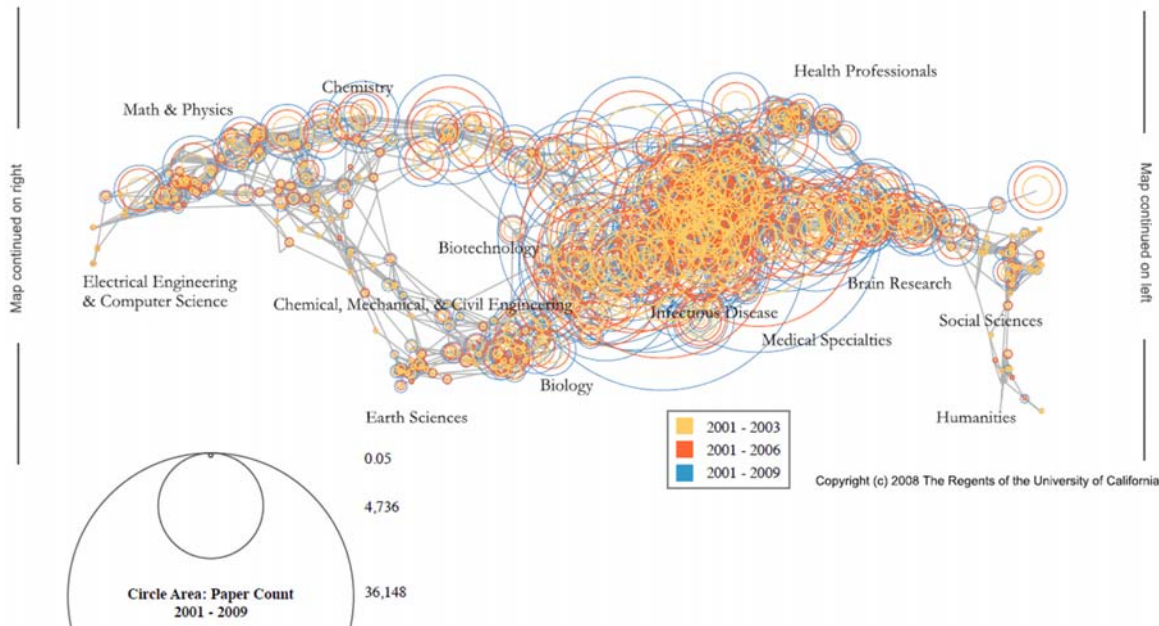
Zoss & Börner, *forthcoming*.

Supported by NIH/NCI Contract HHSN261200800812



MEDLINE Publication Output by The National Institutes of Health (NIH) Using Nine Years of ExPORTER Data

Katy Börner, Nianli Ma, Joseph R. Biberstine, Cyberinfrastructure for Network Science Center, SLIS, Indiana University, Robin M. Wagner, Rediet Berhane, Hong Jiang, Susan E. Ivey, Katrina Pearson and Carl McCabe, Reporting Branch, Division of Information Services, Office of Research Information Systems, Office of Extramural Research, Office of the Director, National Institutes of Health (NIH), Bethesda, MD.



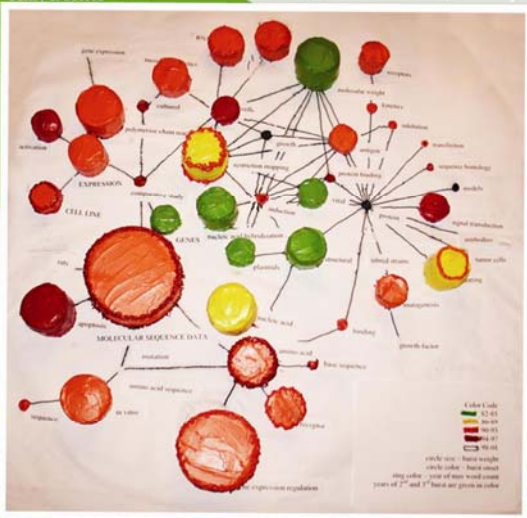
Merry Christmas and Happy New Year! 2008

Jon Burgoyne, Katy Börner
Russell J. Duhon

Shravan Rajagopal
Heng (Michael) Zhang
Bruce W. Herr II
Julie M. Smith
Chung-Yang (Kenneth) Lee



Weixia (Bonnie) Huang
Elisha F. Hardy
Fileve Palmer
Bruce W. Herr II



Kristin E. Reed
Stacy Kowalevzk
Micah Linnemeier
Bryan J. Hook
Nianli Ma
Elisha F. Hardy
Fileve Palmer
Carol Walter
Rengpeng Hu
Richard Pinapati
Todd Holloway
Heng (Michael) Zhang
Peter A. Hook
Benjamin Ray Gonzalez
Hook N

Cake created by Kristin Reed and Lydia Nichols. They insisted on having a legend!

<http://ella.slis.indiana.edu/~katy> <http://scimaps.org> <http://ivl.slis.indiana.edu>

Information Diffusion Among Major U.S. Research Institutions

Börner, Katy, Penumarthy, Shashikant, Meiss, Mark & Ke, Weimao. (2006). Mapping the Diffusion of Information among Major U.S. Research Institutions. *Scientometrics*. Vol. 68(3), 415 - 426.

Questions:

- Does space still matter in the Internet age, i.e., does one still have to study and work at major research institutions in order to have access to high quality data and expertise and to produce high quality research?
- Does the Internet lead to more global citation patterns, i.e., more citation links between papers produced at geographically distant research institutions?



Contributions:

- Answer to Q1 is YES.
- Answer to Q2 is NO.
- Novel approach to analyzing the dual role of institutions as information producers and consumers and to study and visualize the diffusion of information among them.

NEWS FEATURE

GROUP THEORY

What makes a successful team? John Whitfield looks at research that uses massive online databases and network analysis to come up with some rules of thumb for productive collaborations.

Perhaps the story of single-author papers would translate into higher impact? In answer to that question, researchers from the University of Illinois at Urbana-Champaign analyzed more than 1 million papers published in the United States from 1975 to 2005. They found that the most cited papers in any year were those that had been written by a single author, but that the pattern changed significantly over time. And the citation gap continues to widen.

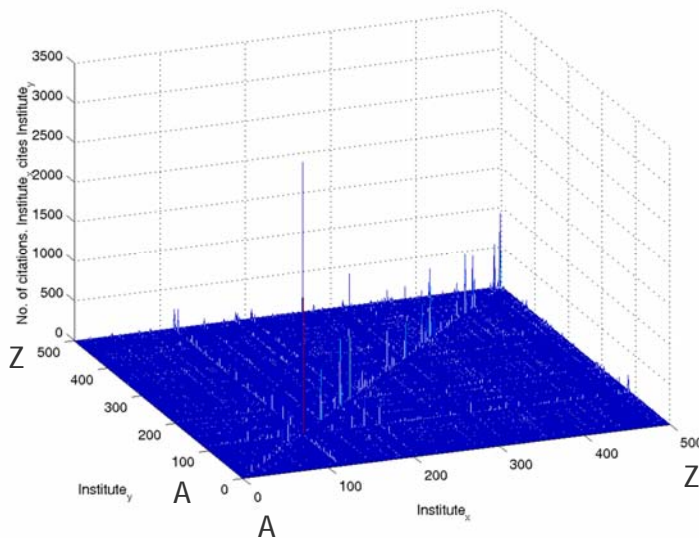
The average of the citation counts for each paper at the time of publication was 1.5. The average of the citation counts for each paper at the time of publication was 1.5. The average of the citation counts for each paper at the time of publication was 1.5.

Researchers have always averaged citation counts, but when they measured the number of citations a paper received, they found that the number of citations a paper received was not such an important indicator of its quality. Instead, they found that the number of citations a paper received was not such an important indicator of its quality. Instead, they found that the number of citations a paper received was not such an important indicator of its quality.

Research is now being done with a focus on understanding the social and technical aspects of research. Researchers are looking for ways to understand the social and technical aspects of research. Researchers are looking for ways to understand the social and technical aspects of research.

Citation Matrix

Unsymmetrical direct citation linkage patterns among the top 500 institutions in US. High peak values in the diagonal reflect the high amount of self-citations for all institutions. Medium peak horizontal and vertical lines denote references from and citations to papers written at Harvard University.



Information Sources (Export) and Sinks (Import)

Calculate ratio of the number of references made by an institution divided by the sum of received citations and references made, multiplied by 100.

131 have a value between 0-40% acting mostly as information producers = information sources.

71 have a value between 60-100% and act mostly as information consumers – they reference a large number of papers but the number of citations they receive is comparably low = information sinks.

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Geographic Location of Received Citations

ESRI's ArcGIS program was used to show the geographic distribution of the top 500 institutions using the Albers equal area projection.

U.S. states are color coded based on the population size in the year 2000. Lighter shades of green represent lower populations.

Overlaid are the top 500 institutions, each represented by a 'citation stick'. The color and height of the stick corresponds to the number of received citations (excluding self citations).

Five institutions produced papers that attracted more than 5,000 citations and are labeled.

Harvard leads with 16,531 citations.



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Information Flow Among the Top-5 Consumers and Their Top-10 Producers

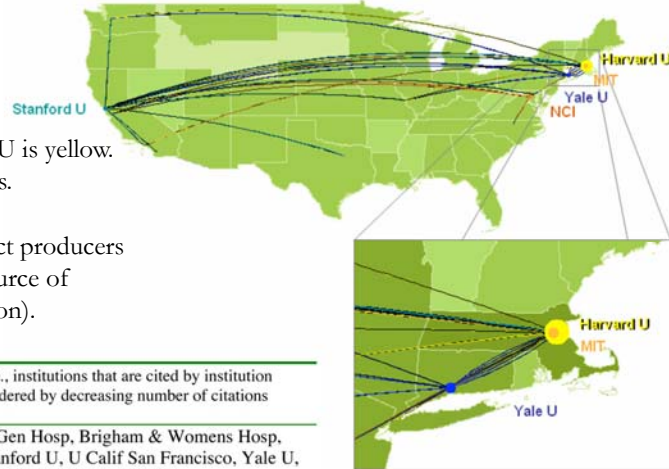
U.S. states are color coded based on the total number of citations received by their institutions (excluding self citations).

Dots indicate the five producers.

Each has a different color, e.g., Harvard U is yellow.

Dot area size depicts number of citations.

Lines represent citations that interconnect producers and consumers shaded from colored (source of information) to white (sink of information).



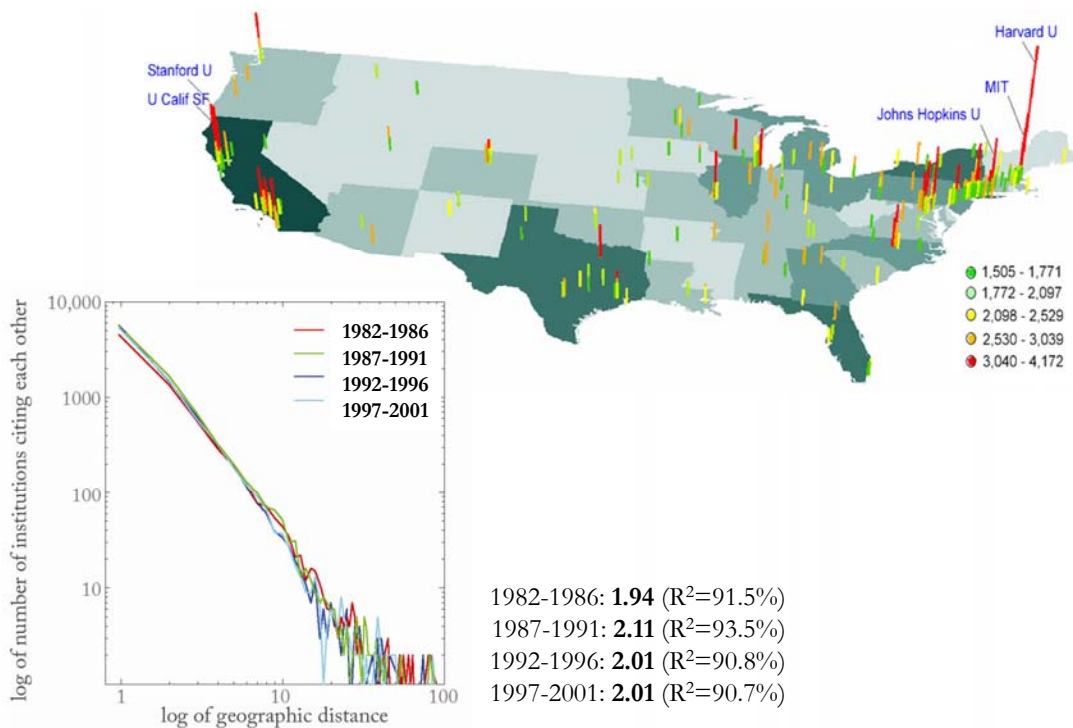
Consumers, i.e., citing institutions	# citations made	Top ten producers, i.e., institutions that are cited by institution listed in first column ordered by decreasing number of citations received.
Harvard U	13,552	MIT, Massachusetts Gen Hosp, Brigham & Womens Hosp, Johns Hopkins U, Stanford U, U Calif San Francisco, Yale U, Rockefeller U, U Washington, Washington U
U Calif SF	4,682	Harvard U, MIT, Stanford U, Johns Hopkins U, U Washington, Washington U, U Calif Berkeley, U Texas, U Calif SD, U Calif LA
MIT	4,655	Harvard U, Whitehead Inst Biomed Res, Johns Hopkins U, Stanford U, U Calif SF, Yale U, Rockefeller U, U Calif LA, Massachusetts Gen Hosp, U Calif Berkeley
NCI (zip: 20814)	4,519	Harvard U, NCI (zip: 20205), NCI (zip: 21701), MIT, Duke U, Johns Hopkins U, NIAID NICHHD, Stanford U, U Calif SF
Yale U	4,464	Harvard U, MIT, Stanford U, Rockefeller U, Johns Hopkins U, Washington U, U Calif SF, U Washington, NCI, Massachusetts Gen Hosp

Paper also shows top-5 producers and their top-10 consumers.

Changes in Citation Behavior Over Time

As time progresses and the amount of produced papers increases, space seems to matter more.

Authors are more likely to cite papers generated by authors at close-by institutions.



Modeling the Co-Evolving Author-Paper Networks

Börner, Katy, Maru, Jeegar & Goldstone, Robert. (2004). *The Simultaneous Evolution of Author and Paper Networks*. PNAS. Vol. 101(Suppl. 1), 5266-5273.



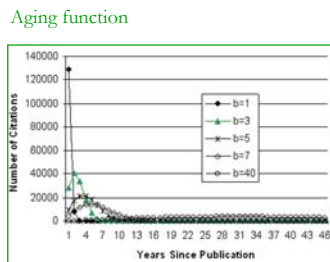
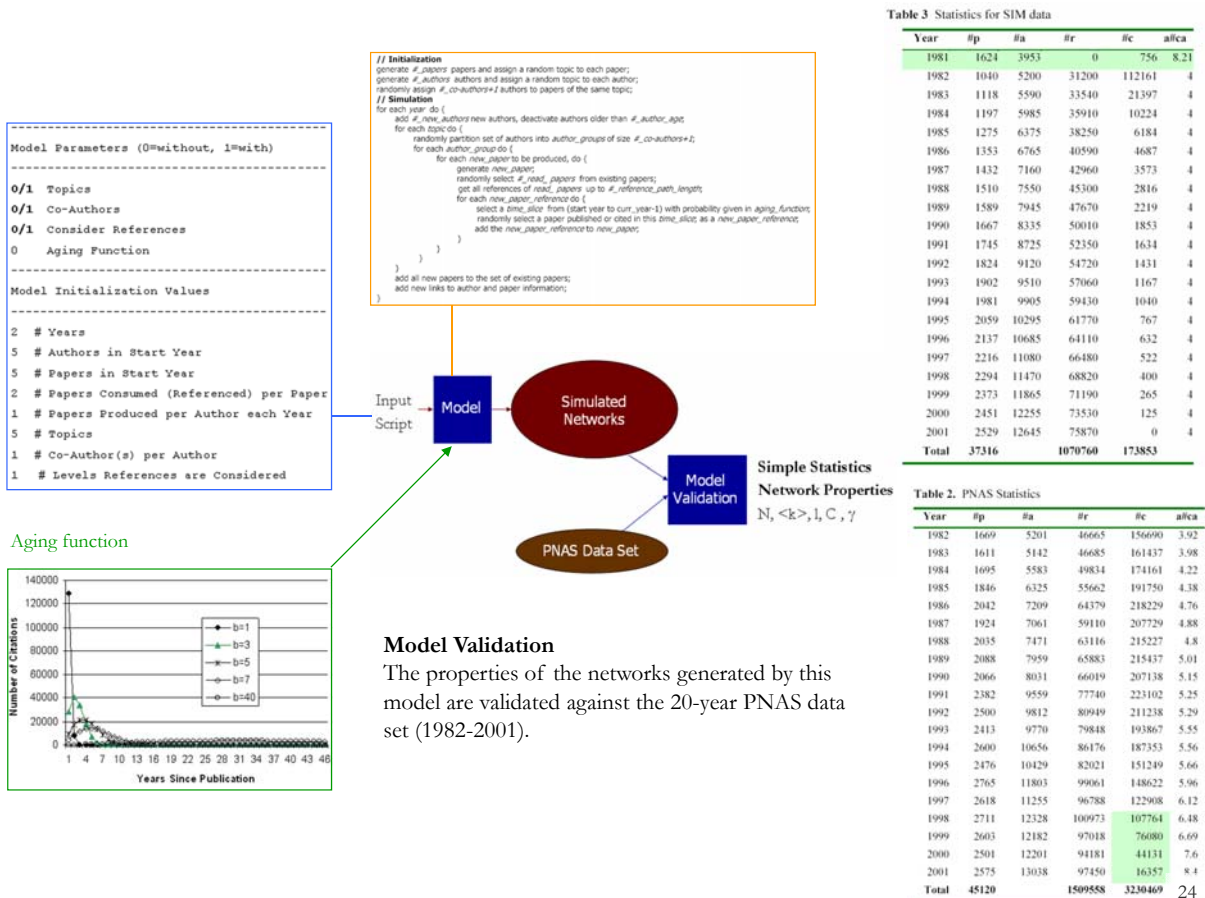
The TARD Model (Topics, Aging, and Recursive Linking) incorporates

- A partitioning of authors and papers into topics,
- Aging, i.e., a bias for authors to cite recent papers, and
- A tendency for authors to cite papers cited by papers that they have read resulting in a rich get richer effect.

The model attempts to capture the roles of authors and papers in the production, storage, and dissemination of knowledge.

Model Assumptions

- Co-author and paper-citation networks co-evolve.
- Authors come and go.
- Papers are forever.
- Only authors that are 'alive' are able to co-author.
- All existing (but no future) papers can be cited.
- Information diffusion occurs directly via co-authorships and indirectly via the consumption of other authors' papers.
- Preferential attachment is modeled as an *emergent property* of the elementary, local networking activity of authors reading and citing papers, but also the references listed in papers.



Process Model in Pseudocode & Input Parameters

If no topics are considered then the number of topics is one, i.e., all papers and authors have the same topic. If no coauthors are considered then each paper has exactly one author. If the reference path length is 0 then no references are considered for citation.

// Initialization

generate $\#_papers$ papers and assign a random topic to each paper;
 generate $\#_authors$ authors and assign a random topic to each author;
 randomly assign $\#_co_authors+1$ authors to papers of the same topic;

// Simulation

```

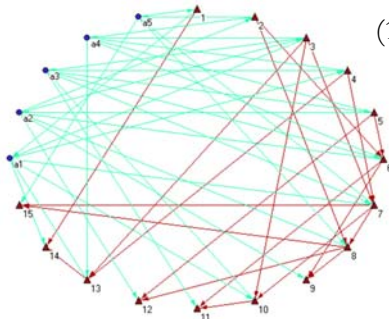
for each year do {
  add  $\#\_new\_authors$  new authors, deactivate authors older than  $\#\_author\_age$ ;
  for each topic do {
    randomly partition set of authors into  $author\_groups$  of size  $\#\_co\_authors+1$ ;
    for each  $author\_group$  do {
      for each  $new\_paper$  to be produced, do {
        generate  $new\_paper$ ;
        randomly select  $\#\_read\_papers$  from existing papers;
        get all references of  $read\_papers$  up to  $\#\_reference\_path\_length$ ;
        for each  $new\_paper\_reference$  do {
          select a  $time\_slice$  from (start year to curr_year-1) with probability given in  $aging\_function$ ;
          randomly select a paper published or cited in this  $time\_slice$ , as a  $new\_paper\_reference$ ;
          add the  $new\_paper\_reference$  to  $new\_paper$ ;
        }
      }
    }
  }
  add all new papers to the set of existing papers;
  add new links to author and paper information;
}
    
```

Model Parameters (0=without, 1=with)	
0/1	Topics
0/1	Co-Authors
0/1	Consider References
0	Aging Function
Model Initialization Values	
2	# Years
5	# Authors in Start Year
5	# Papers in Start Year
2	# Papers Consumed (Referenced) per Paper
1	# Papers Produced per Author each Year
5	# Topics
1	# Co-Author(s) per Author
1	# Levels References are Considered

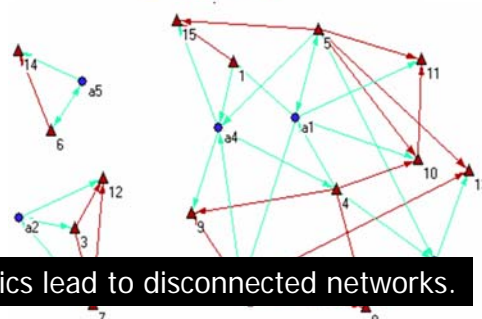
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The TARL Model: The Effect of Parameters

(0000)

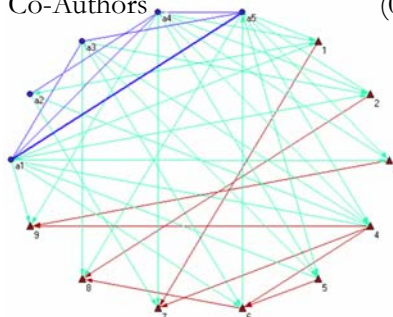


(1000) Topics

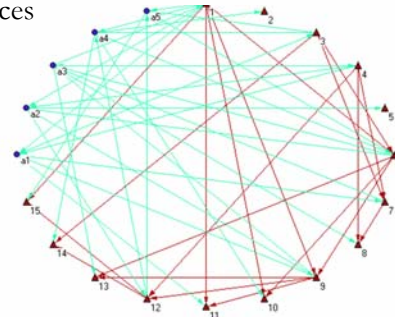


Topics lead to disconnected networks.

(0100) Co-Authors



(0010) References



Co-authoring leads to fewer papers.

26

```

Model Parameters (0=without, 1=with)
-----
0/1 Topics
0/1 Co-Authors
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0 Aging Function
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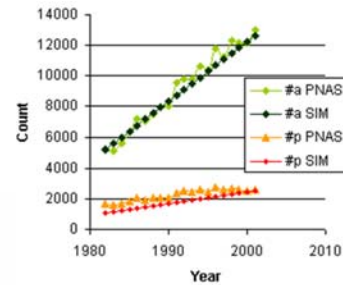
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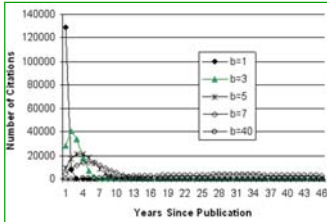
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generate #_papers papers and assign a random topic to each paper;
generate #_authors authors and assign a random topic to each author;
randomly assign #_co-authors+J authors to papers of the same topic;
// Simulation
for each year do {
  add #_new_authors new authors, deactivate authors older than #_author_age;
  for each topic do {
    randomly partition set of authors into author_group of size #_co-authors+J;
    for each author_group do {
      for each new_paper to be produced, do {
        generate new_papers;
        randomly select #_read_papers from existing papers;
        get all references of read_papers up to #_reference_path_length;
        for each new_paper, reference do {
          select a time_slice from (start year to cur_year-1) with probability given in aging_function;
          randomly select a paper published or cited in this time_slice as a new_paper_reference;
          add the new_paper_reference to new_papers;
        }
      }
    }
  }
  add all new papers to the set of existing papers;
  add new links to author and paper information;
}

```

Counts for Papers and Authors

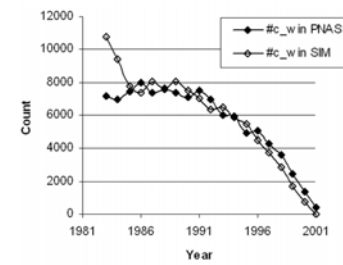


Aging function



Simple Statistics
Network Properties
 $N, \langle k \rangle, l, C, \gamma$

Counts for Citations



```

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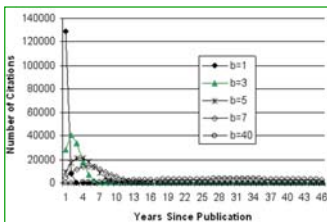
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Table 2. Properties of co-author & paper citation networks comprising number of nodes n , average node degree $\langle k \rangle$, path length l , cluster coefficient C , and power law exponent γ . Source references are given in the left column.

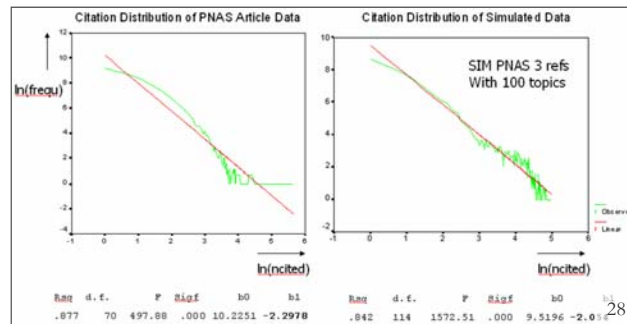
Network	n	$\langle k \rangle$	l	C	γ	Reference
Co-authorship networks						
LANL	52,909	9.7	5.9	0.43	--	Newman, (2001a; 2001b; 2001c)
MEDLINE	1,520,251	18.1	4.6	0.066	--	
SPIRES	56,627	1.73	4.0	0.726	1.2	
NCSTRL	11,994	3.59	9.7	0.496	--	
Math.	70,975	3.9	9.5	0.59	2.5	Barabasi et al., (2002)
Neurosci.	209,293	11.5	6	0.76	2.1	
PNAS	105,915	8.97	5.89	0.399	2.54	
Paper-citation networks						
ISI	783,339	8.57	--	--	3	Redner, (1998)
PhysRev	24,296	14.5	--	--	3	
PNAS	45,120	3.53	--	0.081	2.29	
SIM	37,114	2.13	--	0.074	2.05	

Co-Author and Paper-Citation Network Properties

Aging function



Power Law Distributions




```

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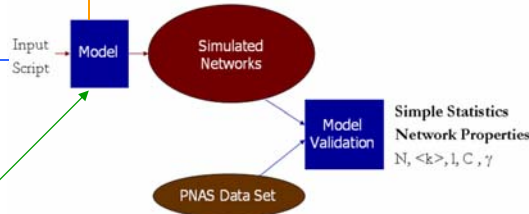
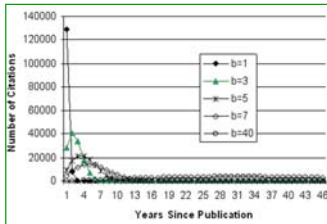
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          randomly select a paper published or cited in this time_slice as a new_paper_reference;
          add the new_paper_reference to new_papers;
        }
      }
    }
  }
  add all new papers to the set of existing papers;
  add new links to author and paper information;
}

```

Aging function



Topics: The number of topics is linearly correlated with the clustering coefficient of the resulting network: $C = 0.000073 * \# \text{topics}$. Increasing the number of topics increases the power law exponent as authors are now restricted to cite papers in their own topics area.

Aging: With increasing b , and hence increasing the number of older papers cited as references, the clustering coefficient decreases. Papers are not only clustered by topic, but also in time, and as a community becomes increasingly nearsighted in terms of their citation practices, the degree of temporal clustering increases.

References/Recursive Linking: The length of the chain of paper citation links that is followed to select references for a new paper also influences the clustering coefficient. Temporal clustering is ameliorated by the practice of citing (and hopefully reading!) the papers that were the earlier inspirations for read papers.

References

Börner, Katy, Chen, Chaomei, and Boyack, Kevin. (2003). **Visualizing Knowledge Domains**. In Blaise Cronin (Ed.), *ARIST*, Medford, NJ: Information Today, Volume 37, Chapter 5, pp. 179-255. <http://ivl.slis.indiana.edu/km/pub/2003-borner-arist.pdf>

Shiffrin, Richard M. and Börner, Katy (Eds.) (2004). **Mapping Knowledge Domains**. *Proceedings of the National Academy of Sciences of the United States of America*, 101(Suppl_1). http://www.pnas.org/content/vol101/suppl_1/

Börner, Katy, Sanyal, Soma and Vespignani, Alessandro (2007). **Network Science**. In Blaise Cronin (Ed.), *ARIST*, Information Today, Inc., Volume 41, Chapter 12, pp. 537-607. <http://ivl.slis.indiana.edu/km/pub/2007-borner-arist.pdf>

Börner, Katy (2010) **Atlas of Science**. MIT Press. <http://scimaps.org/atlas>

Scharnhorst, Andrea, Börner, Katy, van den Besselaar, Peter (2011) **Models of Science Dynamics**. Springer Verlag.

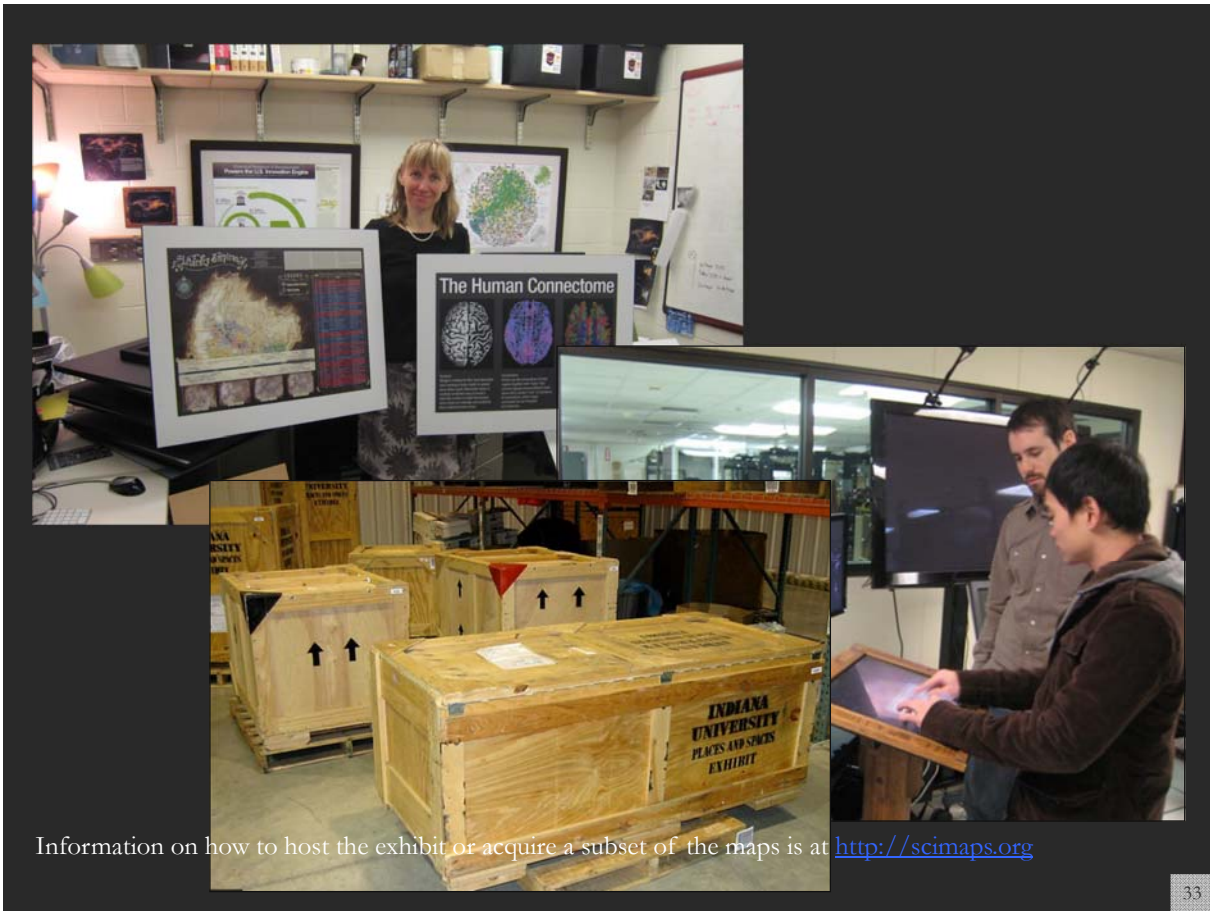




Debut of 5th Iteration of Mapping Science Exhibit at MEDIA X was on May 18, 2009 at Wallenberg Hall, Stanford University, <http://mediax.stanford.edu>, <http://scaleindependentthought.typepad.com/photos/scimaps>

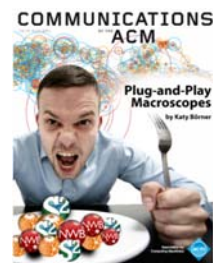


Science Maps in “Expedition Zukunft” science train visiting 62 cities in 7 months 12 coaches, 300 m long Opening was on April 23rd, 2009 by German Chancellor Merkel
<http://www.expedition-zukunft.de>



Overview

1. **Data mining and visualization research** that aims to increase our scientific understanding of the structure and dynamics of science and technology.
2. **Novel approaches and services** that improve information access, researcher networking, and research management.
3. **Data services and plug-and-play macroscope tools** that commoditize data mining and visualization.



Different Stakeholder Groups and Their Needs

Funding Agencies

- Need to monitor (long-term) money flow and research developments, identify areas for future development, stimulate new research areas, evaluate funding strategies for different programs, decide on project durations, funding patterns.

Scholars

- Want easy access to research results, relevant funding programs and their success rates, potential collaborators, competitors, related projects/publications (*research push*).

Industry

- Is interested in fast and easy access to major results, experts, etc. Influences the direction of research by entering information on needed technologies (*industry-pull*).

Advantages for Publishers

- Need easy to use interfaces to massive amounts of interlinked data. Need to communicate data provenance, quality, and context.

Society

- Needs easy access to scientific knowledge and expertise.

Scholars Have Different Roles/Needs

Researchers and Authors—need to select promising research topics, students, collaborators, and publication venues to increase their reputation. They benefit from a global view of competencies, reputation and connectivity of scholars; hot and cold research topics and bursts of activity, and funding available per research area.

Editors—have to determine editorial board members, assign papers to reviewers, and ultimately accept or reject papers. Editors need to know the position of their journals in the evolving world of science. They need to advertise their journals appropriately and attract high-quality submissions, which will in turn increase the journal's reputation.

Reviewers—read, critique, and suggest changes to help improve the quality of papers and funding proposals. They need to identify related works that should be cited or complementary skills that authors might consider when selecting project collaborators.

Teachers/Mentors—teach classes, train doctoral students, and supervise postdoctoral researchers. They need to identify key works, experts, and examples relevant to a topic area and teach them in the context of global science.

Inventors—create intellectual property and obtain patents, thus needing to navigate and make sense of research spaces as well as intellectual property spaces.

Investigators—scholars need funding to support students, hire staff, purchase equipment, or attend conferences. Here, research interests and proposals have to be matched with existing federal and commercial funding opportunities, possible industry collaborators and sponsors.


Team Leads and Science Administrators—many scholars direct multiple research projects simultaneously. Some have full-time staff, research scientists, and technicians in their laboratories and centers. Leaders need to evaluate performance and provide references for current or previous members; report the progress of different projects to funding agencies.

Mapping Sustainability Research

MAPSustain

Mapping Sustainability Research

Geographic Map Science Map



Map data ©2010 Europa Technologies, INEGI

Funding
 NIH
 NSF
 USDA

Publications
 DOE
 ISI
 Medline

Patents
 USPTO

Citations Count

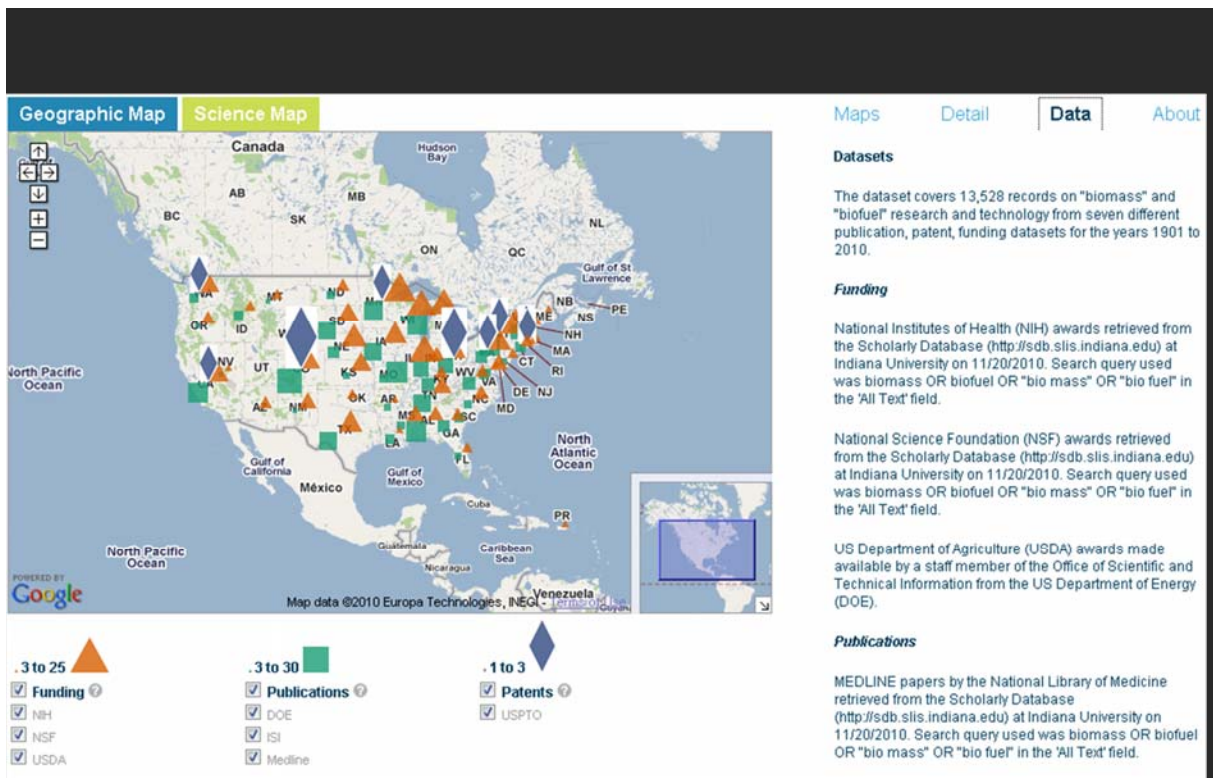
Amount Count

From year 1901 to year 2009

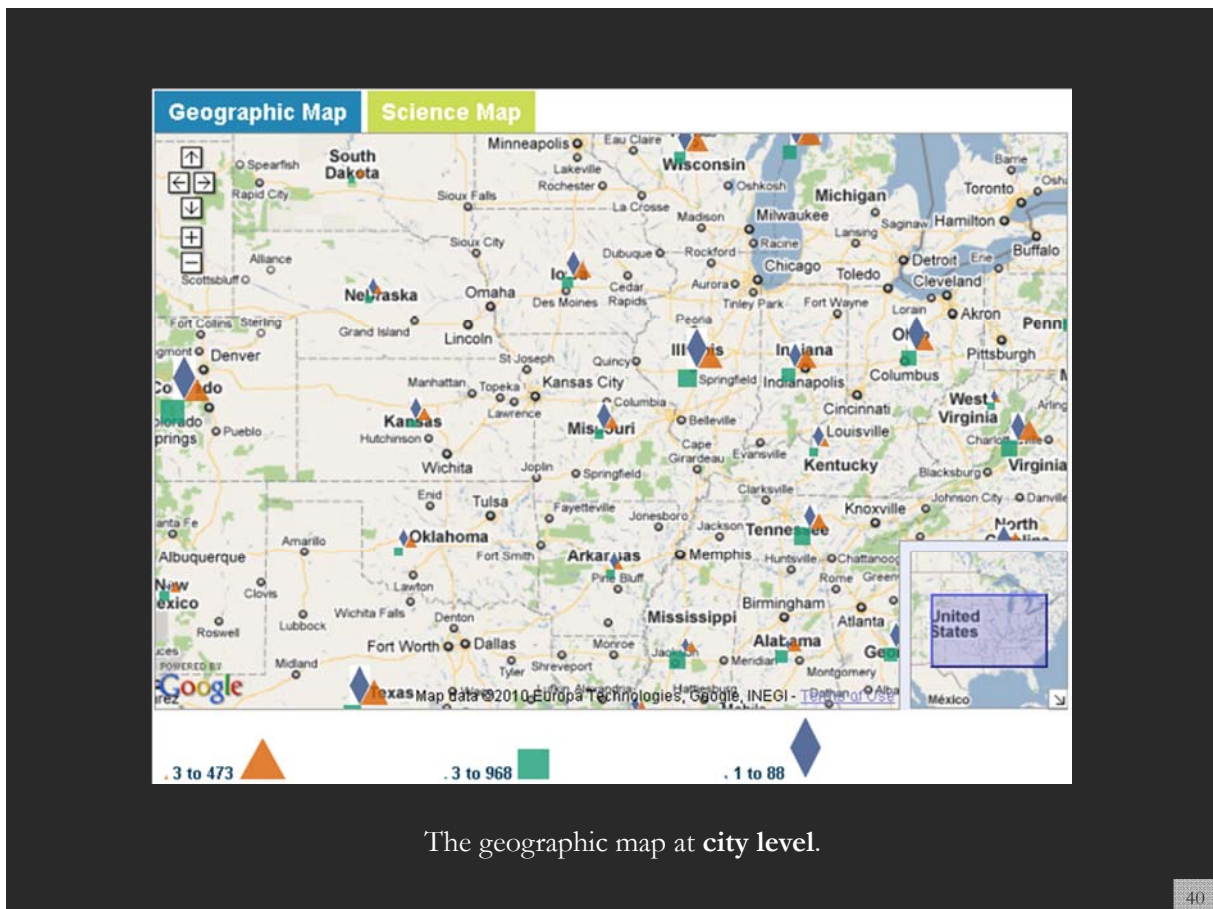
Search by keyword

<http://mapsustain.cns.iu.edu>

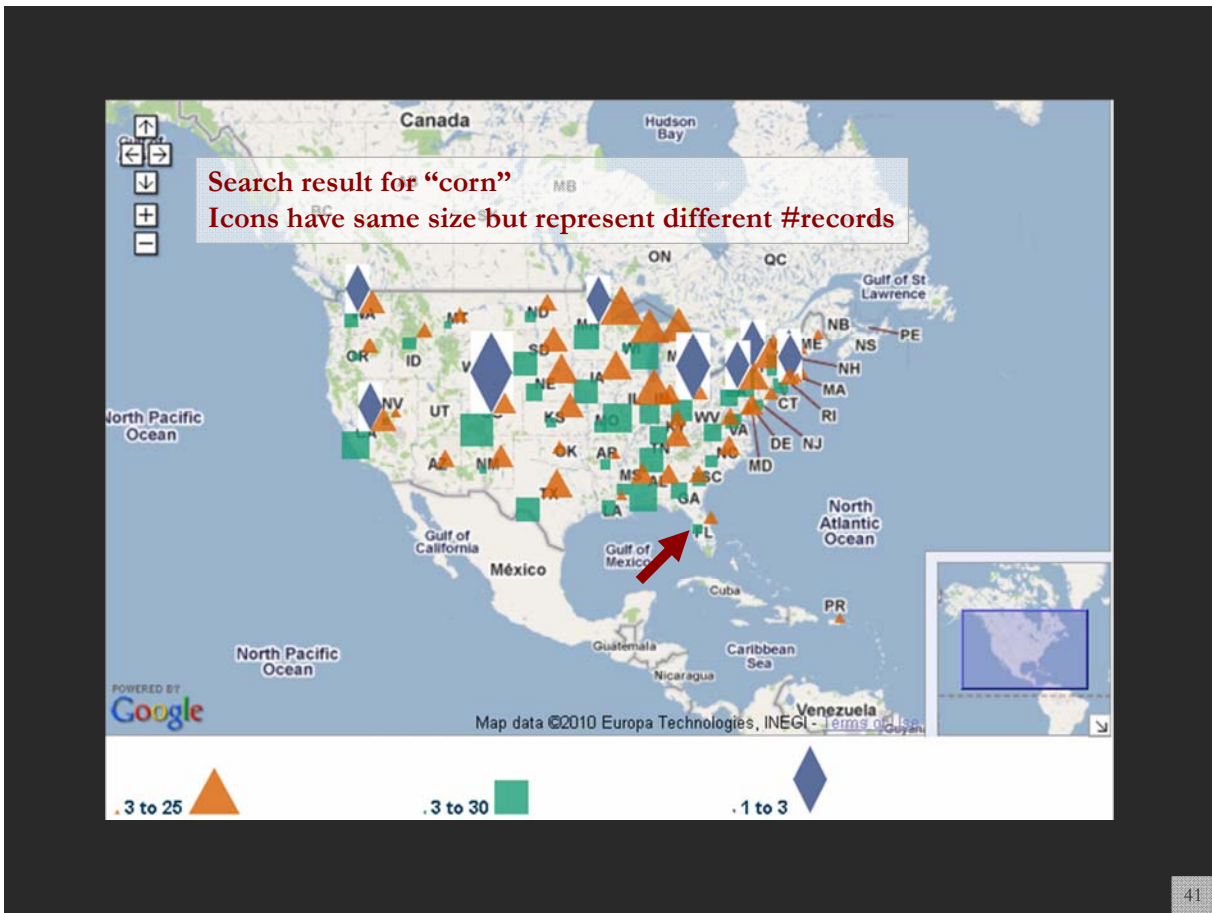
CYBERINFRASTRUCTURE for NETWORK SCIENCE CENTER
School of Library and Information Science, Indiana University



The geographic map at state level.



The geographic map at city level.



Science Map

Click on one icon to display all records of one type.
Here publications in the state of Florida.

Florida publications: 2 records
DOE: 1
MEDLINE: 1

Maps Detail Data About

> Florida

MEDLINE 2002

- Recovery Of Dairy Manure Nutrients By Benthic Freshwater Algae

DOE 1985

- Enzymatic Hydrolysis And Fermentation Of Corn For Fuel Alcohol

42

Information Bridge: DOE Scientific and Technical Information - - Document #5789929 - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.osti.gov/bridge/product.biblio.jsp?osti_id=5789929

Most Visited Getting Started Latest Headlines

MapSustain Information Bridge: DOE Scientifi...

DOE Scientific and Technical Information

DOE • OSTI

INFORMATION BRIDGE

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Full Text Availability information may be found in the Availability, Publisher, Research Organization, Resource Relation and/or Author (affiliation information) fields and/or via the "Full-text Availability" link. For a journal article, please see the Resource Relation field.

Title Enzymatic hydrolysis and fermentation of corn for fuel alcohol
[Word Cloud](#) | [More Like This](#)

Creator/Author [Mullins, J.T.](#)

Publication Date 1985 Jan 01

OSTI Identifier OSTI ID: 5789929

Other Number(s) Journal ID: CODEN: BIBIA

Resource Type Journal Article

Resource Relation Journal Name: Biotechnol. Bioeng.; (United States); Journal Volume: 27:3

Research Org Univ. of Florida, Gainesville

Subject 09 BIOMASS FUELS; 32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION; ETHANOL FUELS; BIOSYNTHESIS; MAIZE; ENZYMATIC HYDROLYSIS; FERMENTATION; PRODUCTIVITY; COST; ENERGY EFFICIENCY; EXPERIMENTAL DATA; WASTE PRODUCT UTILIZATION; ALCOHOL FUELS; BIOCONVERSION; CEREALS; CHEMICAL REACTIONS; DATA; DECOMPOSITION; EFFICIENCY; FUELS; GRASS; HYDROLYSIS; INFORMATION; LYSIS; NUMERICAL DATA; PLANTS;

Done

Detailed information on demand via original source site for exploration and study.

43

Geographic Map Science Map

Color B & W

Math and Physics Chemistry Health Professionals

Engineering and Computer Science Medical Societies

Biotechnology Brain Research

Chemical, Materials and Earth Sciences Biology Social Sciences

Humanities

Biology funding: 2112 records
 NSF: 1617
 NIH: 114
 USDA: 391

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Maps Detail Data Ab

> Biology

NIH
 2009

- Label-Free And Simultaneous Detection Of Multiple Bacterial Pathogens And Virulen
- Mechanism Of Psp Mediated Adhesion
- Label-Free And Simultaneous Detection Of Multiple Bacterial Pathogens And Virulen
- Novel Mechanism Of Uranium Reduction Via Microbial Nanowires
- Nano-Scale Mechanisms Of Metal(Loid) Rhizostabilization In Desert Mine Tailings
- Label-Free And Simultaneous Detection Of Multiple Bacterial Pathogens And Virulen
- Mechanism Of Psp Mediated Adhesion

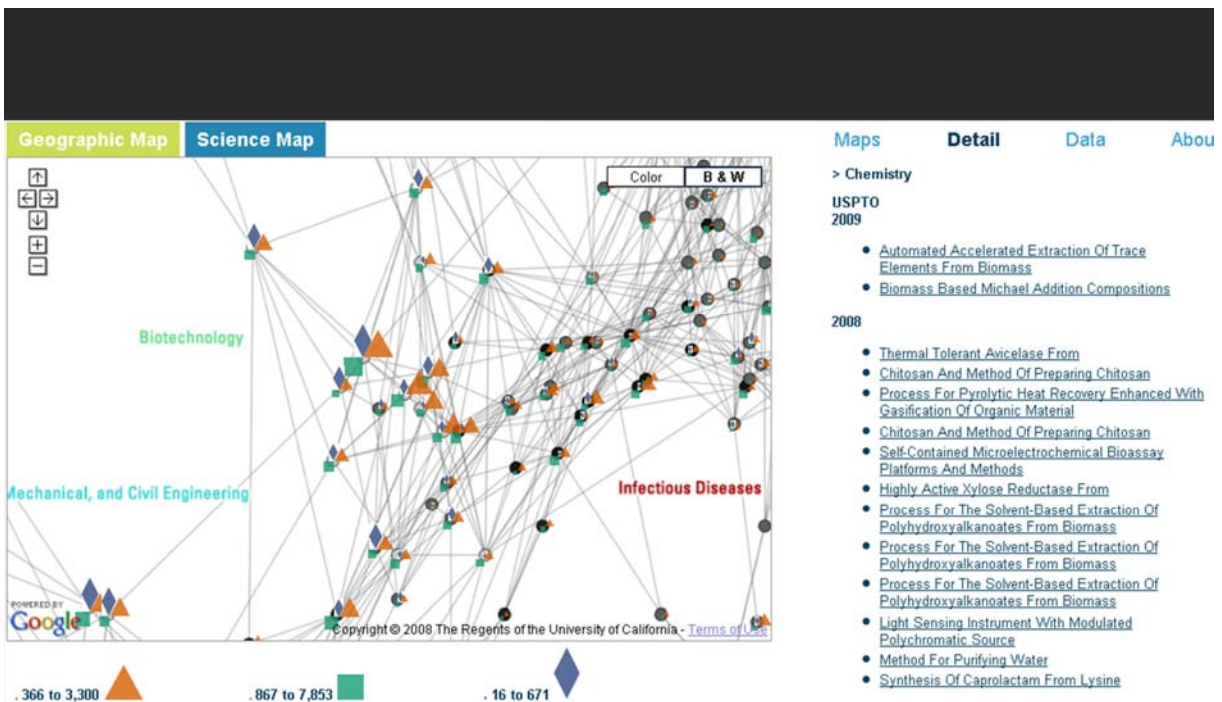
2008

- The Effect Of Inter-Species Interactions On The Virulence Of Streptococcus Mutans
- Cook-stove Replacement For Prevention Of Ari And Low Birthweight In Nepal
- Diverse Drug Lead Compounds From Bacterial Symbionts In Tropical Marine Mollusks
- Remote Sensing Of Wildfire Smoke Exposures To Assess Health Effects
- Cook-stove Replacement For Prevention Of Ari And Low Birthweight In Nepal

.366 to 3,300 .867 to 7,853 .16 to 671

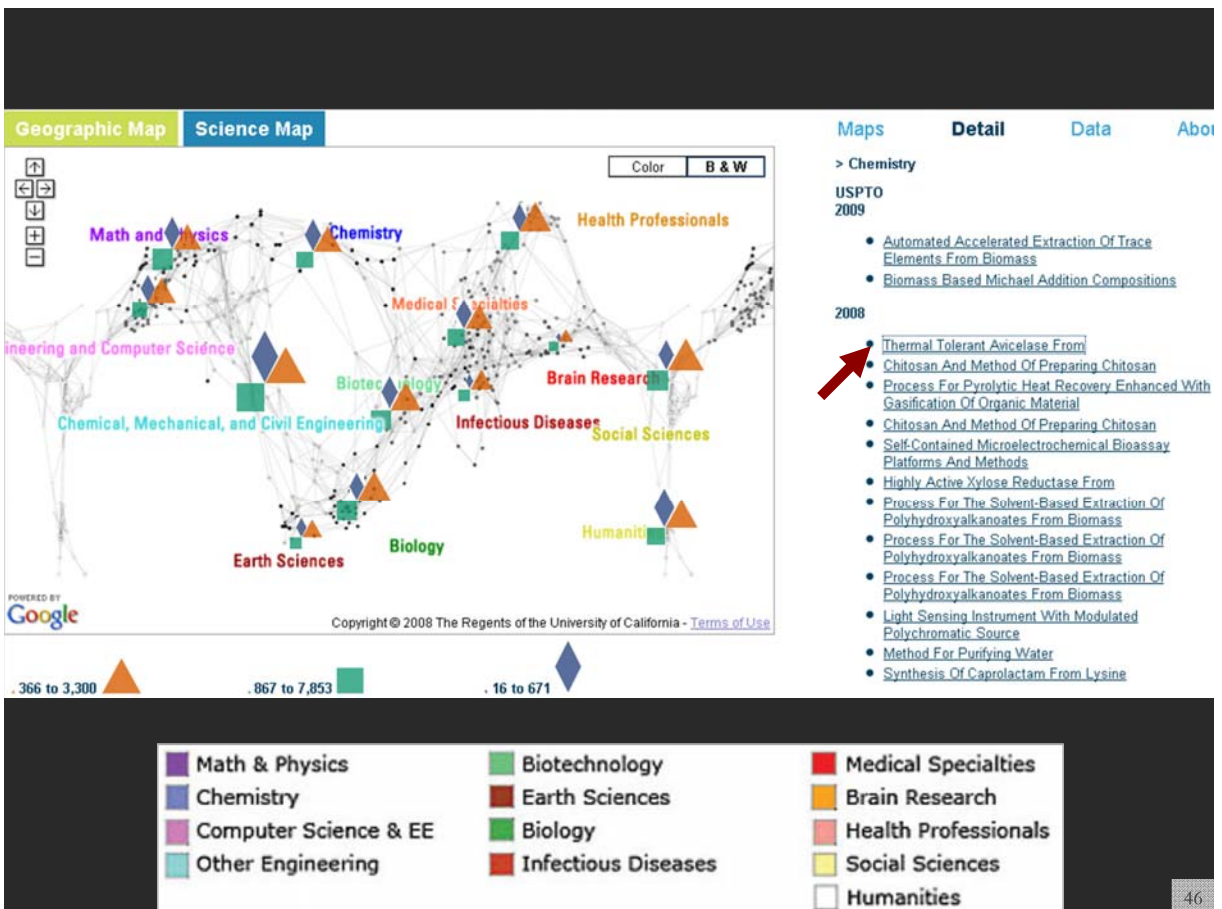
The science map at 13 top-level scientific disciplines level.

44



The science map at 554 sub-disciplines level.

45



46

NIH TOPIC MAPS

A Topic Database of NIH-Funded Grants

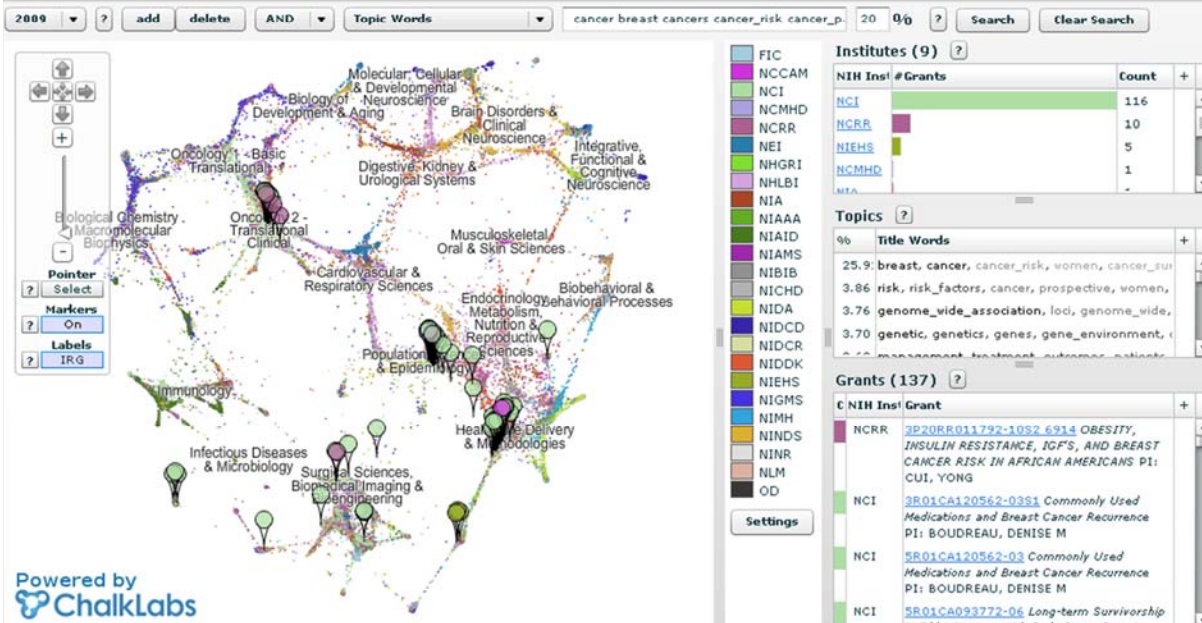
NIH Map Viewer

Show Topic Browser ?

Export Data

Methods

Feedback



<https://app.nihmaps.org>

49

NIH TOPIC MAPS

A Topic Database of NIH-Funded Grants

NIH Topic Browser

Show Map Viewer ?

Export Data

Methods

Feedback

2009 ? add delete AND Exact Text cancer Search Clear Search

Topics by NIH Institute Topics by Category

2009 Grants (137)

Col	NIH Inst	Project/Subproj#	Title	Investigator(s)	# 1 Topi	# 1 Topic Word	+
	NCRR	3P20RR011792-10S2 6914	OBESITY, INSULIN RESISTANCE, IGF'S, AND BREAST CANCER RISK IN AFRICAN AMERICANS	CUI, YONG	686 (50%)	cancer brea...	
	NCI	3R01CA120562-03S1	Commonly Used Medications and Breast Cancer Recurrence	BOUDREAU, DENISE M	686 (42%)	cancer brea...	
	NCI	5R01CA120562-03	Commonly Used Medications and Breast Cancer Recurrence	BOUDREAU, DENISE M	686 (42%)	cancer brea...	
	NCI	5R01CA093772-06	Long-term Survivorship in Older Women with Early Stage Breast Cancer	SILLIMAN, REBECCA A	686 (42%)	cancer brea...	
	NCI	5R01CA064277-11	Shanghai Breast Cancer Study	ZHENG, WEI	686 (41%)	cancer brea...	

Institutes (9)

NIH Inst	# Grants	Count	+
NCI	116		
NCRR	10		
NIHES	5		
NCMHD	1		
NIA	1		
NCCAM	1		
NICHHD	1		
NINR	1		
NHGRI	1		

Topics

%	Topic	Topic Words	Title Words	+
25.91	686	cancer breast cancers cancer_risk cancer_patients	breast, cancer, car	
3.86	437	risk risk_factors cases cohort prospective high_ris	risk, risk_factors,	
3.76	544	snps snp genome_wide_association cases genes	genome_wide_ass	
3.70	173	genetic genes risk susceptibility polymorphisms	genetic, genetics,	
2.62	252	treatment patients management patient outcom	management, tre	
1.64	235	conference meeting workshop symposium scienti	th, conference, sy	
1.63	351	community implementation community_based he	community, preve	
1.54	325	million disease treatment united_states public_h	disease, treatmen	
1.51	580	training candidate career skills applicant program	treatment, depres	

Similar Grants Show Top 100 on Map

Similar	NIH Inst	Grant	+
6.51	NCI	1R01CA129639-01A2 Genome-Wide Association Study of Radiation Exposure and Bilateral Breast Cancer PI: BERNSTEIN, JONINE LISA	
6.46	NCI	1K07CA136758-01A1 Genetic variants in the PI3K pathway in mammographic density and breast cancer PI: THOMPSON, CHERYL L.	
6.31	NCI	5P50CA116199-05 UTMADACC SPORE in Breast Cancer PI: HORTOBAGYI, GABRIEL N	
6.02	NCI	2R01CA050385-21A1 Risk Factors for Breast Cancer in Younger Nurses PI: WILLETT, WALTER C.	
4.6	NCI	5R01CA127617-02 Who Cares For Older Breast Cancer Survivors And How Does It Affect Quality? PI: MANDELBLATT, JEANNE	

<https://app.nihmaps.org>

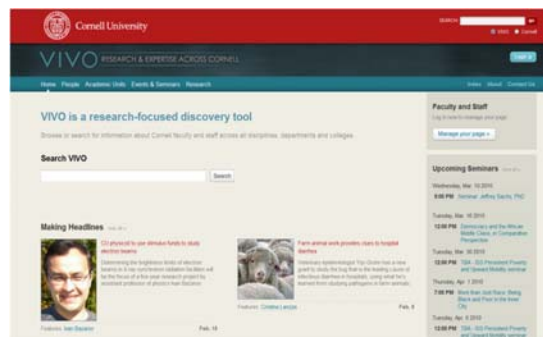
50

VIVO International Researcher Network

VIVO: A Semantic Approach to Creating a National Network of Researchers (<http://vivoweb.org>)



- Semantic web application and ontology editor originally developed at Cornell U.
- Integrates research and scholarship info from systems of record across institution(s).
- Facilitates research discovery and cross-disciplinary collaboration.
- Simplify reporting tasks, e.g., generate biosketch, department report.



Funded by \$12 million NIH award.

Cornell University: Dean Krafft (Cornell PI), Manolo Bevia, Jim Blake, Nick Cappadona, Brian Caruso, Jon Corson-Rikert, Elly Cramer, Medha Devare, John Ferreira, Brian Lowe, Stella Mitchell, Holly Mistlebauer, Anup Sawant, Christopher Westling, Rebecca Younes. **University of Florida:** Mike Conlon (VIVO and UF PI), Cecilia Botero, Kerry Britt, Erin Brooks, Amy Buhler, Ellie Bushhousen, Chris Case, Valrie Davis, Nita Ferree, Chris Haines, Rae Jesano, Margeaux Johnson, Sara Kreinest, Yang Li, Paula Markes, Sara Russell Gonzalez, Alexander Rockwell, Nancy Schaefer, Michele R. Tennant, George Hack, Chris Barnes, Narayan Raum, Brenda Stevens, Alicia Turner, Stephen Williams. **Indiana University:** Katy Borner (IU PI), William Barnett, Shanshan Chen, Ying Ding, Russell Duhon, Jon Dunn, Micah Linnemeier, Nianli Ma, Robert McDonald, Barbara Ann O'Leary, Mark Price, Yuyin Sun, Alan Walsh, Brian Wheeler, Angela Zoss. **Ponce School of Medicine:** Richard Noel (Ponce PI), Ricardo Espada, Damaris Torres. **The Scripps Research Institute:** Gerald Joyce (Scripps PI), Greg Dunlap, Catherine Dunn, Brant Kelley, Paula King, Angela Murrell, Barbara Noble, Cary Thomas, Michaelen Trimarchi. **Washington University, St. Louis:** Rakesh Nagarajan (WUSTL PI), Kristi L. Holmes, Sunita B. Koul, Leslie D. McIntosh. **Weill Cornell Medical College:** Curtis Cole (Weill PI), Paul Albert, Victor Brodsky, Adam Cheriff, Oscar Cruz, Dan Dickinson, Chris Huang, Itay Klaz, Peter Michelini, Grace Migliorisi, John Ruffing, Jason Specland, Tru Tran, Jesse Turner, Vinay Varughese.

VIVO Enabling a National Network of Scientists

Home People Organizations Research Events

Davis, Vairie I | AST UNV LIBRA

Positions

- Medical Science Librarian, Outreach Librarian for Agricultural Sciences (2002 - 2003)**
- Medical Science Librarian, Stark Maintenance Supervisor (2001 - 2002)**
- AST UNV LIBRARIAN**

13 publications within the last 10 years (11 leads)

17 identifiers

152772289

Primary Web Page

Medical Science Librarian (2011 - 2020)

Affiliations

Publications **Research** **Background** **Contact** **Other**

Affiliation

professional title: Outreach Librarian for Agricultural Sciences

VIVO Enabling a National Network of Scientists

Home People Organizations Research Events

University of Florida

How do you want to compare?
by Publications

Who do you want to compare?
Search: [] X

Records 1 - 10 of 13

Entity Name	Publication Count	Entity Type
<input checked="" type="checkbox"/> Interdisciplinary Center for Bioremediation	18	UF Center, Agent, Center
<input checked="" type="checkbox"/> Continuing Education	24	UF Department, Agent, Non-Academic Department, Department
<input checked="" type="checkbox"/> Levin College of Law	17	Agent, UF College, College
<input checked="" type="checkbox"/> College of Agricultural and Life Sciences	14	Agent, UF College, College
<input type="checkbox"/> Whittier College of Journalism and Communications	14	Agent, UF College, College
<input type="checkbox"/> Center for Environmental and Estuarine Science	8	UF Center, Agent, Center

Comparing Publications of Organizations in University of Florida

Total Number of Publications

You have selected 4 of a maximum 10 organizations to compare. **Clear**

- College of Agricultural and Life Sciences: 14
- Levin College of Law: 17
- Continuing Education: 24
- Interdisciplinary Center for Bioremediation: 18

VIVO Enabling a National Network of Scientists

Home People Organizations Research Events

Search results for 'geriatrics'

Show only results of this type: **people activities organizations research**

AMERICAN GERIATRICS SOCIETY

- Geriatrics Education Curriculum, Residents (Geri) Program
- Evidence Based Decision Making in Geriatrics, Geriatrics, Disability

AMERICAN GERIATRICS SOCIETY

- Harford Geriatrics Leadership Scholar
- Geriatrics and Aging Research Institute on Aging (GRI)

ASSOCIATION OF GERIATRICS ACADEMIC PROGRAMS

- US OLTH RESOURCES AND SERVICES ADMIN
- Suifortn Study
- 2003 Scholar, Harford Institute of Geriatrics, Nursing Research, John A. Harford Institute for Geriatrics, Nursing, New York University
- Gene, Polysomnography and Prevention of Obstructive
- Insulinemia in the Sea Surface Echin
- Cardiac Mitral Regurgitation, Regurgitation and Mitral Regurgitation
- ANES, ACAD OF NURSING
- The Epidemiology of Stress and the Menopausal Syndrome
- Statement by a Sea Surface Echin

VIVO Enabling a National Network of Scientists

Home People Organizations Research Events

Welcome to VIVO

VIVO is a research-focused discovery tool that enables collaboration among scientists across all disciplines.

Browse or search information on people, departments, courses, grants, and publications.

Search VIVO

Log in

Email: []

ORCID: []

Password: []

Remember me: []

Log in

Browse by

- Grants (11,814)
- People (48,721)
- Activities (11,818)
- Courses (1116)
- Events (379)
- Organizations (20,328)
- Research (11,283)
- Locations (376)
- Faculty Member (8882)
- Graduate Student (1)
- Librarian (67)
- Non-Academic (7536)
- Non-Faculty Academic (1)
- Alumn (8972)
- Professor Emeritus (802)

UF Clinical and Translational Science Institute
UNIVERSITY of FLORIDA

University of Florida

How do you want to compare?
by Grants

Who do you want to compare?
Search: [] X

Records 1 - 10 of 30

Entity Label	Grant Count	Entity Type
<input checked="" type="checkbox"/> Continuing Education	562	UF Department, Agent, Non-Academic Department, Department
<input checked="" type="checkbox"/> Florida Museum of Natural History	203	Museum, Agent
<input checked="" type="checkbox"/> College of Agricultural and Life Sciences	166	Agent, UF College, College
<input checked="" type="checkbox"/> College of Engineering	103	Agent, UF College, College
<input checked="" type="checkbox"/> Evelyn F. and William L. McKnight Brain Institute of the University of Florida	64	UF Center, Agent, Center
<input checked="" type="checkbox"/> International Center	54	UF Department, Agent, Non-Academic Department, Department
<input checked="" type="checkbox"/> Florida Sea Grant	44	UF Center, Agent, Center
<input type="checkbox"/> Whitney Laboratory for Marine Bioscience	42	UF Research Laboratory, Agent, Laboratory, Research Laboratory
<input type="checkbox"/> Water Institute	38	UF Center, Agent, Center
<input type="checkbox"/> College of Dentistry	35	Agent, UF College, College

Comparing Grants of Organizations in University of Florida

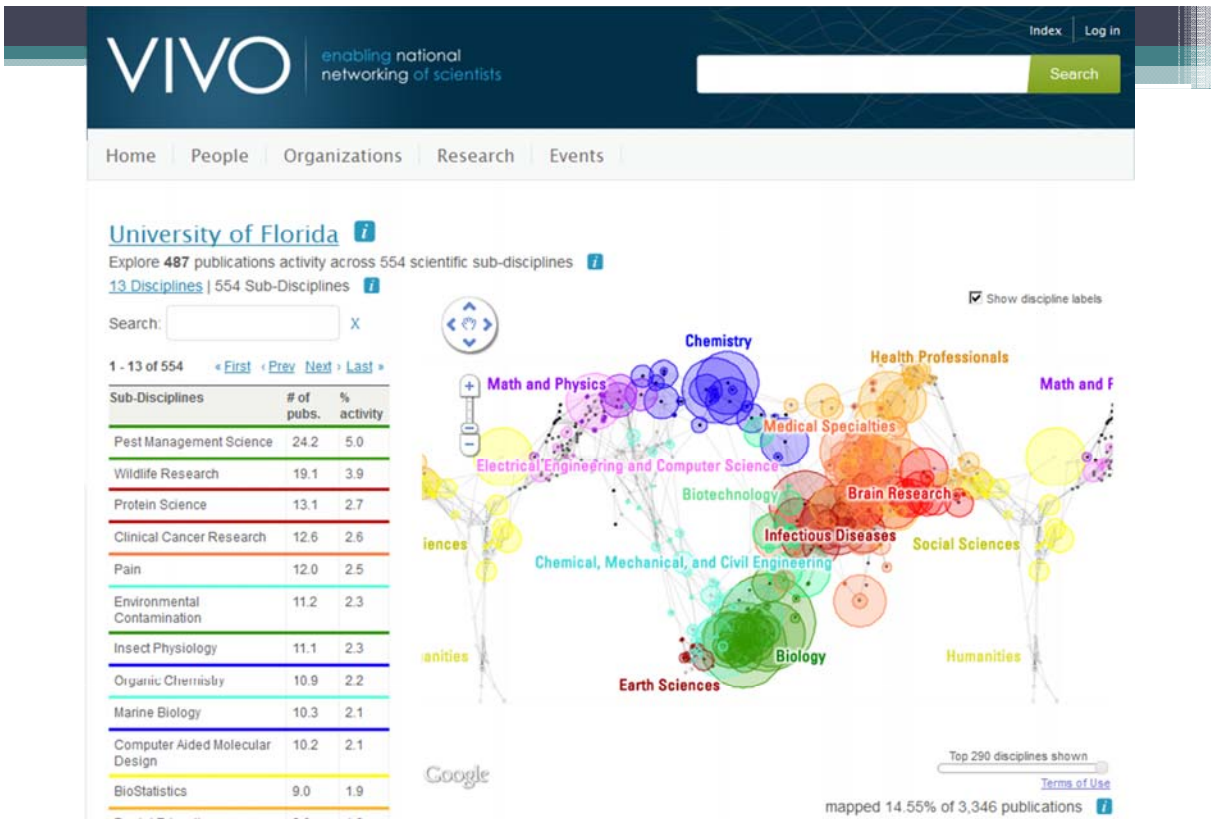
Total Number of Grants

You have selected 7 of a maximum 10 organizations to compare. **Clear**

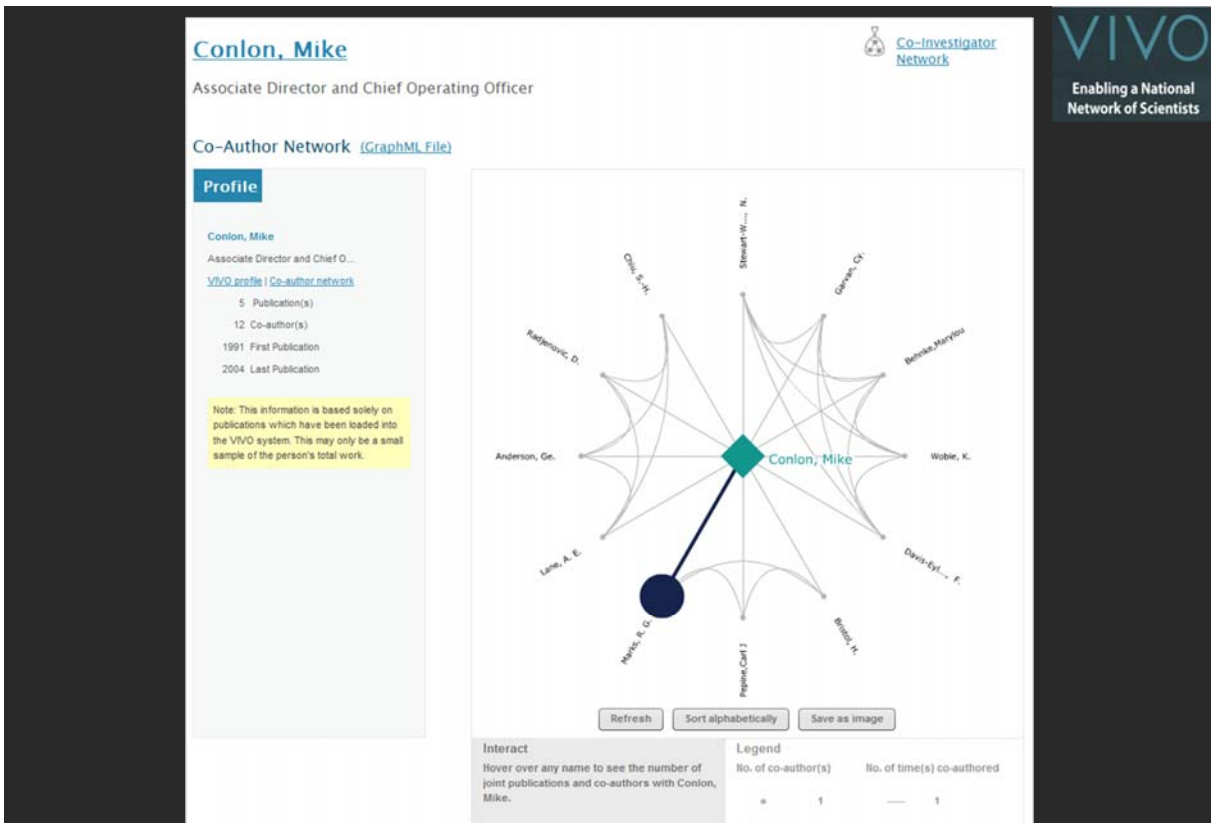
- Florida Sea Grant: 44
- International Center: 54
- Evelyn F. and William L. McKnight Brain Institute of the University of Florida: 64
- College of Engineering: 103
- College of Agricultural and Life Sciences: 166
- Florida Museum of Natural History: 203
- Continuing Education: 562

Save as CSV **Clear**

Temporal Analysis (When) Temporal visualizations of the number of papers/funding award at the institution, school, department, and people level

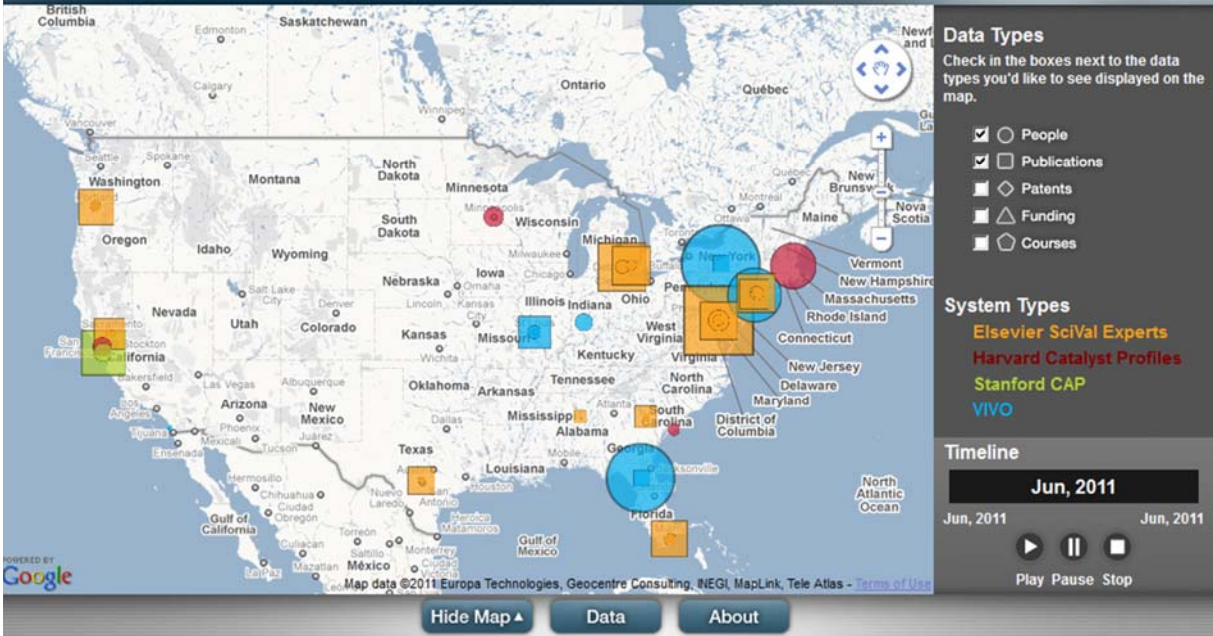


Topical Analysis (What) Science map overlays will show where a person, department, or university publishes most in the world of science. (in work)



Network Analysis (With Whom?) Who is co-authoring, co-investigating, co-inventing with whom? What teams are most productive in what projects?

National Researcher Networking Visualization 1.0



<http://nrn.cns.iu.edu>

Geospatial Analysis (Where) Where is what science performed by whom? Science is global and needs to be studied globally.

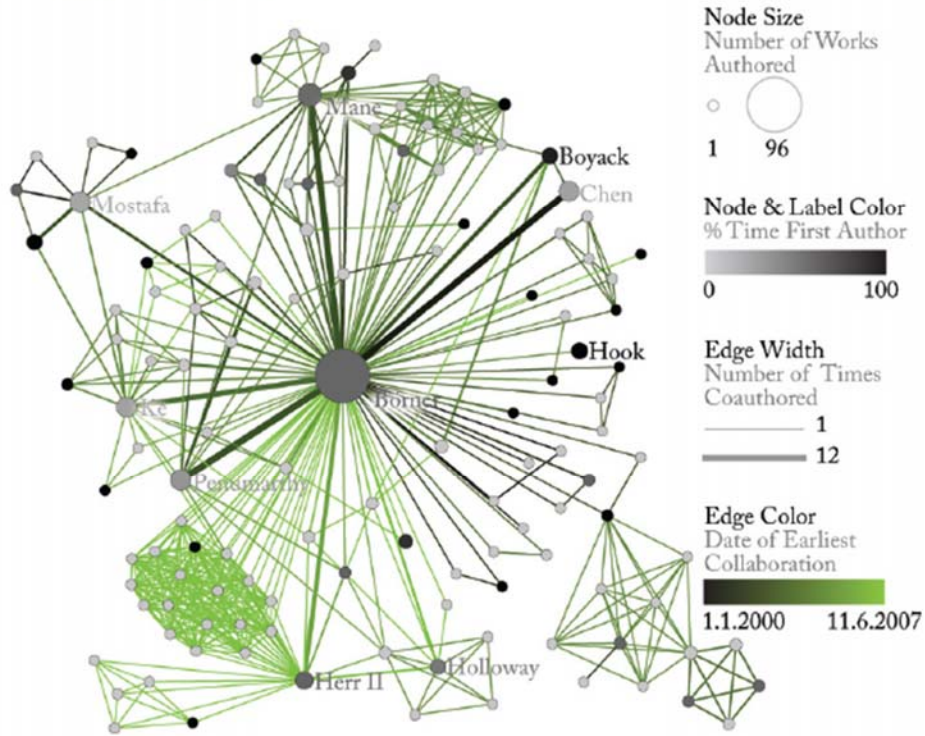


VIVO On-The-Go

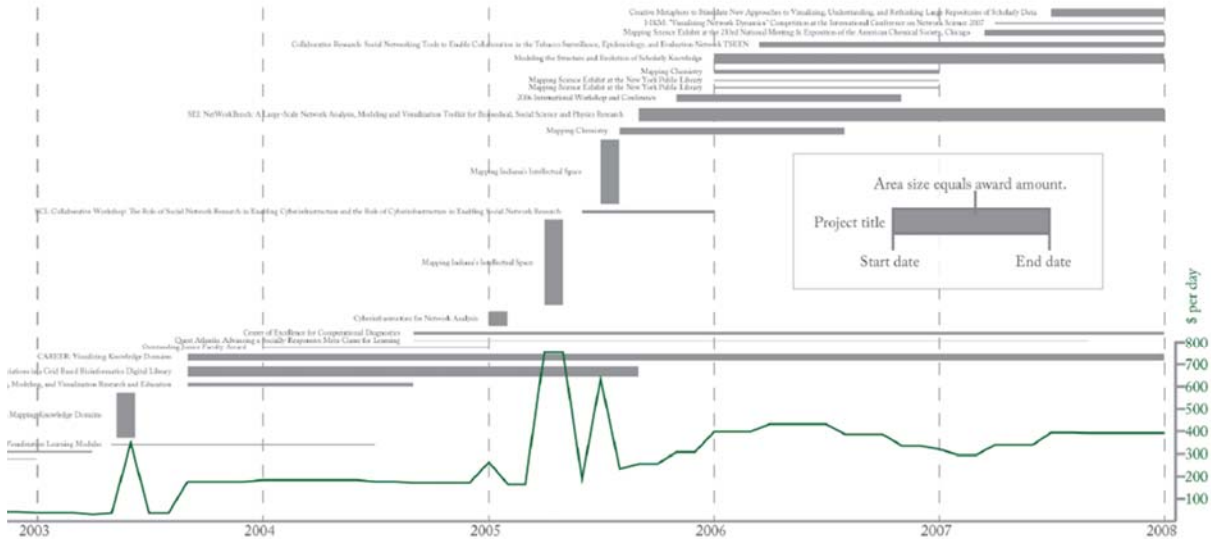
Overview, Interactivity,
Details on Demand
come to
commonly
used devices
and environments



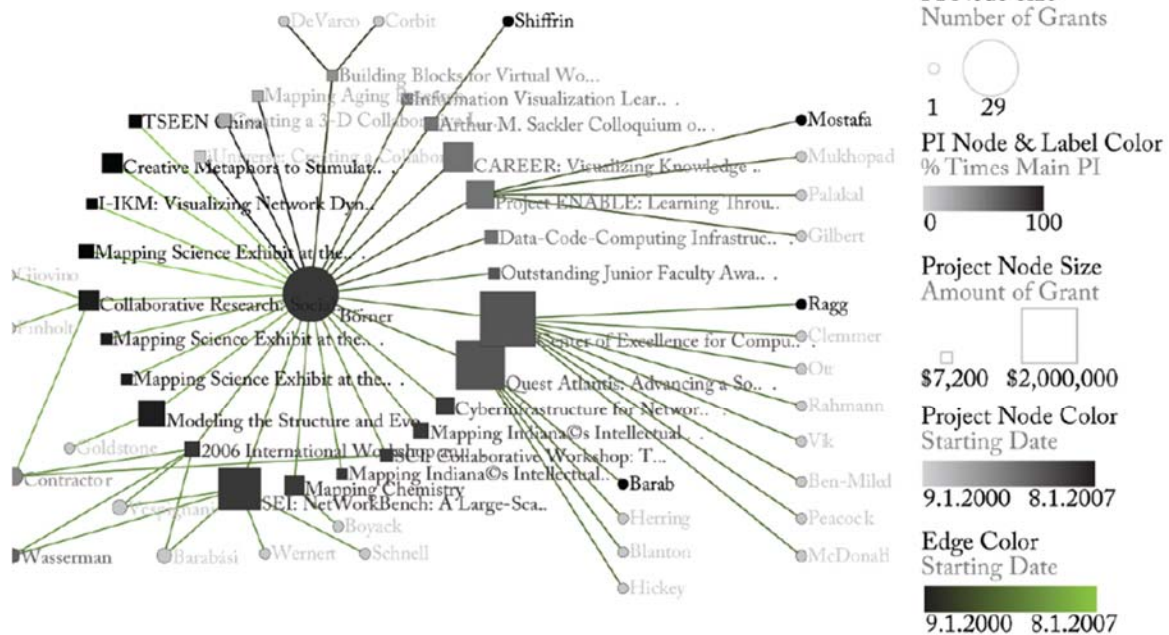
Coauthor Network



Project Timeline



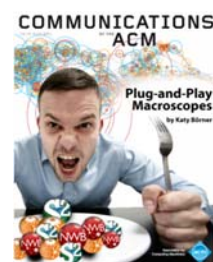
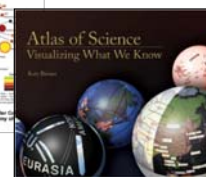
Investigator-Project Network

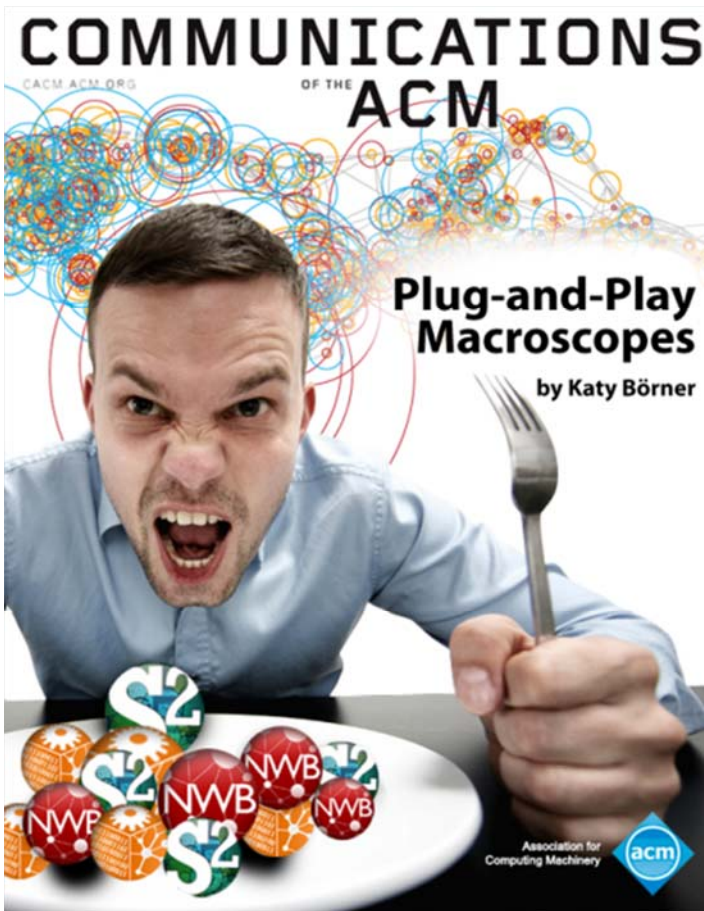


61

Overview

1. **Data mining and visualization research** that aims to increase our scientific understanding of the structure and dynamics of science and technology.
2. **Novel approaches and services** that improve information access, researcher networking, and research management.
3. **Data services and plug-and-play macroscope tools** that commoditize data mining and visualization.

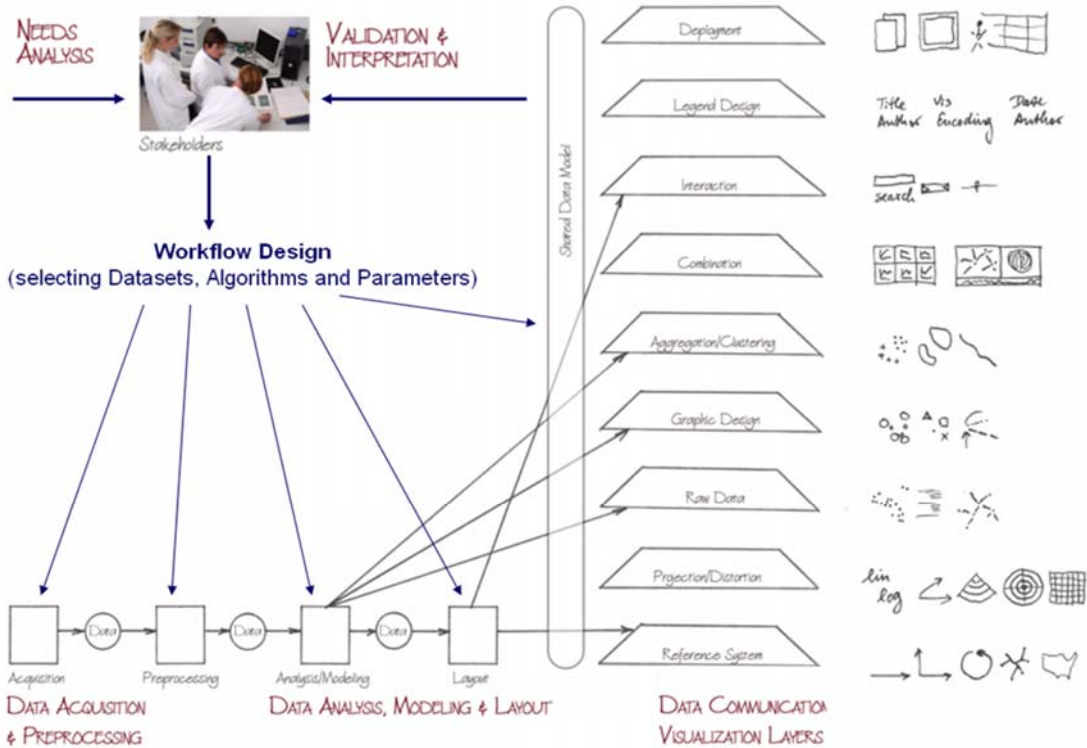




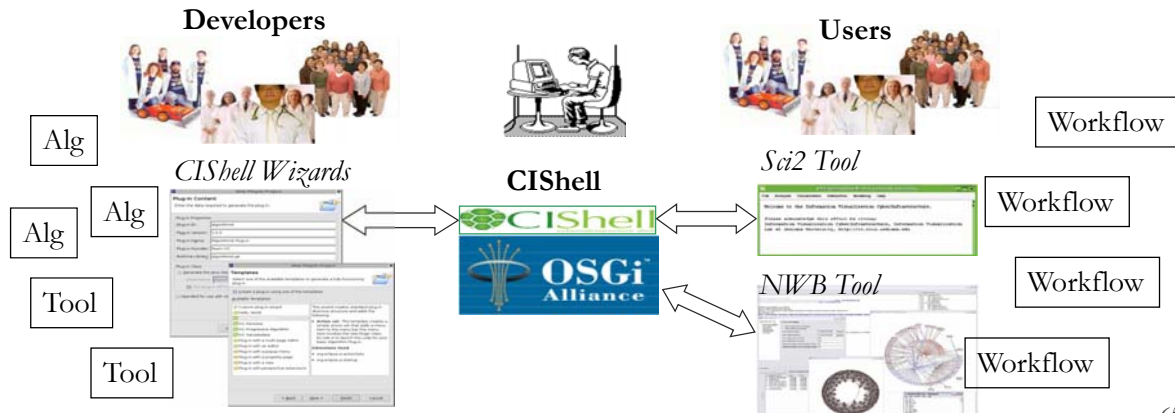
Börner, Katy. (March 2011).
 Plug-and-Play Macroscopes.
Communications of the ACM,
 54(3), 60-69.

Video and paper are at
<http://www.scivee.tv/node/27704>

Needs-Driven Workflow Design using a modular data acquisition/analysis/
 modeling/ visualization pipeline as well as modular visualization layers.



- CIShell (<http://cishell.org>) is an open source software specification for the integration and utilization of datasets, algorithms, and tools.
- It extends the Open Services Gateway Initiative (OSGi) (<http://osgi.org>), a standardized, component oriented, computing environment for networked services widely used in industry since more than 10 years.
- Specifically, CIShell provides “sockets” into which existing and new datasets, algorithms, and tools can be plugged using a wizard-driven process.



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About the Cyberinfrastructure Shell

The Cyberinfrastructure Shell (CIShell) is an open source, community-driven platform for the integration and utilization of datasets, algorithms, tools, and computing resources. Algorithm integration support is built in for Java and most other programming languages. Being Java based, it will run on almost all platforms. The software and specification is released under an Apache 2.0 License.

CIShell is the basis of [Network Workbench](#), [TexTrend](#), [Sci²](#) and the upcoming [EpiC](#) tool.

CIShell supports remote execution of algorithms. A standard web service definition is in development that will allow pools of algorithms to transparently be used in a peer-to-peer, client-server, or web front-end fashion.

CIShell Features

A framework for easy integration of new and existing algorithms written in any programming language

Using CIShell, an algorithm writer can fully concentrate on creating their own algorithm in whatever language they are comfortable with. Simple tools are provided to then take their algorithm and

Learn More...

- [CIShell Papers](#)
- [CIShell Powered Tools](#)
- [Algorithms](#)
- [Plugins \(coming soon\)](#)
- [Misc. Tool Documentation](#)
- CIShell Web Services (coming soon)
- [Screenshots](#)

Getting Started...

- [Documentation & Developer Resources](#)
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66

67



Network Workbench Tool

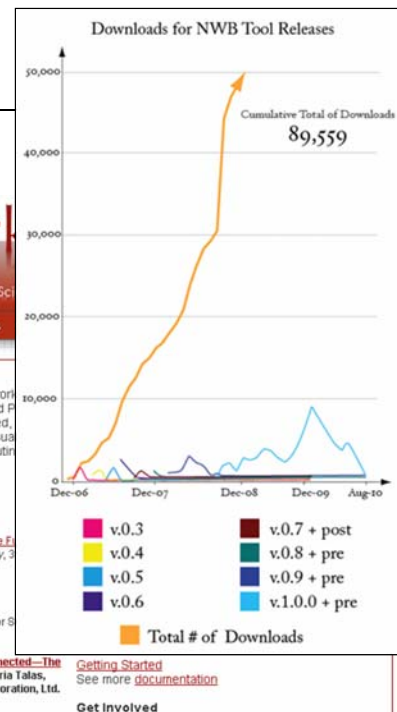
<http://nwb.cns.edu>

The Network Workbench (NWB) tool supports researchers, educators, and practitioners interested in the study of biomedical, social and behavioral science, physics, and other networks.

In February 2009, the tool provides more than 169 plugins that support the preprocessing, analysis, modeling, and visualization of networks.

More than 50 of these plugins can be applied or were specifically designed for S&T studies.

It has been downloaded more than 65,000 times since December 2006.



Computational Proteomics

What relationships exist between protein targets of all drugs and all disease-gene products in the human protein–protein interaction network?

Yildirim, Muhammed A., Kwan-II Goh, Michael E. Cusick, Albert-László Barabási, and Marc Vidal. (2007). Drug-target Network. Nature Biotechnology 25 no. 10: 1119-1126.



Figure 2 Drug-target network (DT network). The DT network is generated by using the known associations between FDA-approved drugs and their target proteins. Circles and rectangles correspond to drugs and target proteins, respectively. A link is placed between a drug node and a target node if the protein is a known target of that drug. The area of the drug (protein) node is proportional to the number of targets that the drug (protein) has (the number of drugs targeting the protein). Color codes are given in the legend. Drug nodes (circles) are colored according to their Anatomical Therapeutic Chemical Classification, and the target proteins (rectangular boxes) are colored according to their cellular component obtained from the Gene Ontology database.

69

Computational Economics

Does the type of product that a country exports matter for subsequent economic performance?

C. A. Hidalgo, B. Klinger, A.-L. Barabási, R. Hausmann (2007) The Product Space Conditions the Development of Nations. Science 317, 482 (2007).

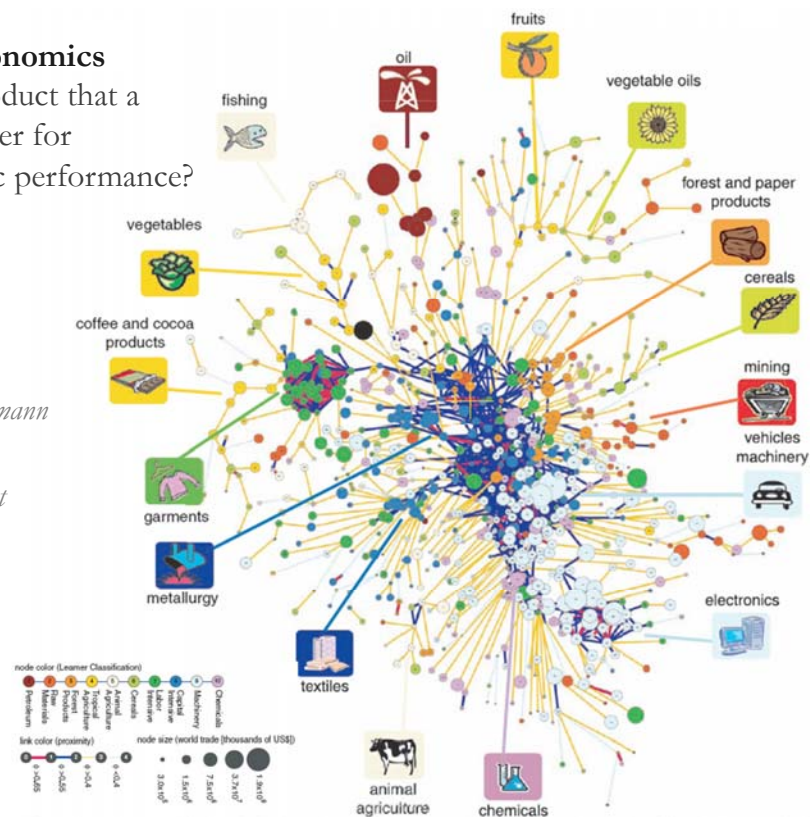


Fig. 1. The product space. (A) Hierarchically clustered proximity matrix representing the 775 SITC-4 product classes exported in the 1998–2000 period. (B) Network representation of the product space. Links are color coded with their proximity value. The sizes of the nodes are proportional to world trade, and their colors are chosen according to the classification introduced by Leamer.

70

Computational Social Science

Studying large scale social networks such as Wikipedia

Second Sight: An Emergent Mosaic of Wikipedian Activity, The NewScientist, May 19, 2007

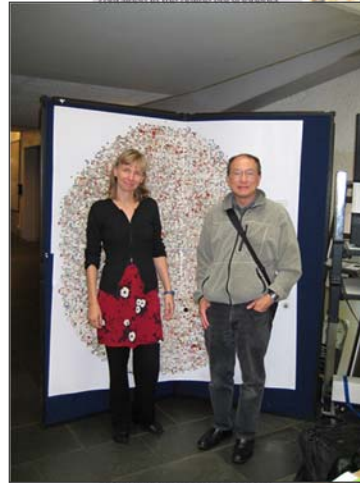


Second sight

Image: Bruce W. Hest and Todd M. Holloway

Power struggle

How do you keep track of the bobbling mass of information that is Wikipedia? This chaotic-looking mosaic is one attempt to show which topics are contained in the online encyclopedia.



...which were the most viewed pages at the time of writing include entries on Sheffield Wednesday football club, Mikhail Gorbachev and pigs). The mosaic has been commended in a competition for images that visualise network dynamics, coinciding with this week's International Workshop and Conference on Network Science in Bloomington.

www.newscientist.com



19 May 2007 | NewScientist | 55

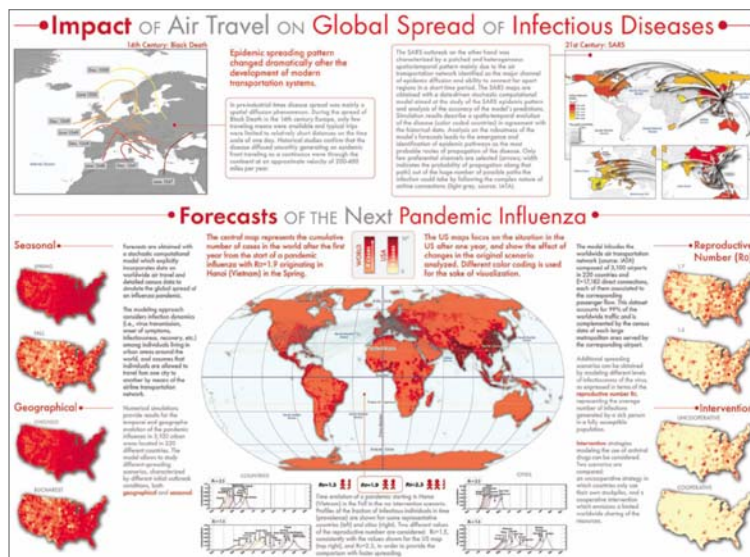
Computational Epidemics

Forecasting (and preventing the effects of) the next pandemic.

Epidemic Modeling in Complex realities, V. Colizza, A. Barrat, M. Barthelemy, A. Vespignani, Comptes Rendus Biologie, 330, 364-374 (2007).

Reaction-diffusion processes and metapopulation models in heterogeneous networks, V. Colizza, R. Pastor-Satorras, A. Vespignani, Nature Physics 3, 276-282 (2007).

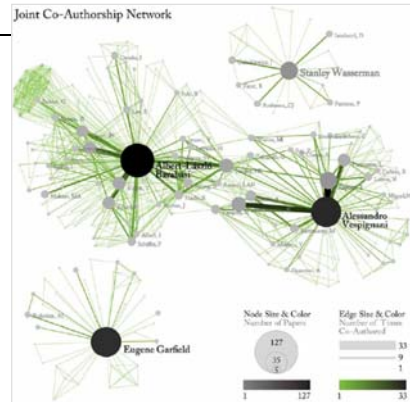
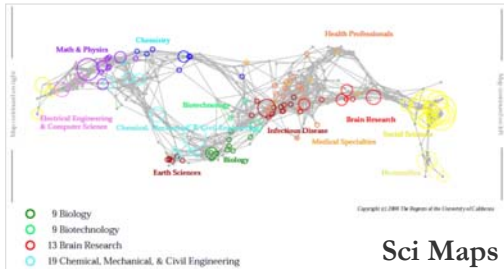
Modeling the Worldwide Spread of Pandemic Influenza: Baseline Case and Containment Interventions, V. Colizza, A. Barrat, M. Barthelemy, A.-J. Valleron, A. Vespignani, PLoS-Medicine 4, e13, 95-110 (2007).





Sci² Tool – “Open Code for S&T Assessment”

OSGi/CIShell powered tool with NWB plugins and many new scientometrics and visualizations plugins.



Horizontal Time Graphs



Börner, Katy, Huang, Weixia (Bonnie), Linnemeier, Micah, Dubon, Russell Jackson, Phillips, Patrick, Ma, Nianli, Zoss, Angela, Guo, Hanning & Price, Mark. (2009). *Rete-Netzwerk-Red: Analyzing and Visualizing Scholarly Networks Using the Scholarly Database and the Network Workbench Tool*. *Proceedings of ISSI 2009: 12th International Conference on Scientometrics and Informetrics, Rio de Janeiro, Brazil, July 14-17*. Vol. 2, pp. 619-630.



Sci² Tool Vis cont.

Sci² Tool

File Preprocessing Modeling Analysis Visualization Scientometrics Help

Console

Welcome to the Science of Science Tool (Sci²). The development of this tool is supported in Network Science center and the School of Li Indiana University, the National Science Foundation and IIS-0715303, and the James S. McDonnell Cyberinfrastructure portal (<http://sci.slis.indiana.edu>).

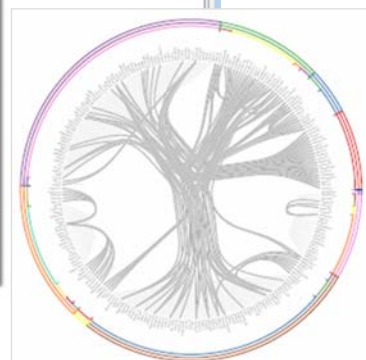
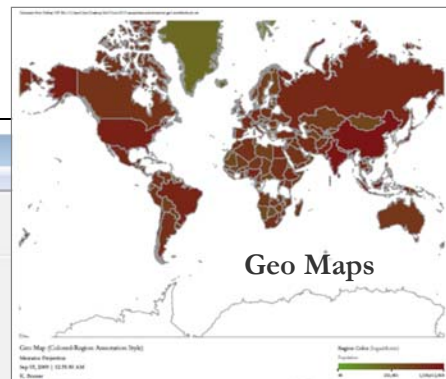
The primary investigators are Katy Börner, In SciTech Strategies Inc. The Sci² tool was developed by J. Duhon, Patrick A. Phillips, Chintan Tank, a Cyberinfrastructure Shell (<http://cishell.org>) for Network Science Center (<http://cns.slis.indiana.edu>). Many algorithm plugins were derived from the Network Workbench Tool (<http://nwb.slis.indiana.edu>).

Please cite as follows:
Sci² Team. (2009). Science of Science Tool. In SciTech Strategies Inc., <http://sci.slis.indiana.edu>.

Scheduler

Remove From List Remove completed

!	Algorithm Name	Date	Time	% Con
<input checked="" type="checkbox"/>	Extract Co-Author Netw...	09/03/2009	00:15:20 AM	100%
<input checked="" type="checkbox"/>	Load and Clean ISI File	09/03/2009	00:15:05 AM	100%



Sci² Tool
A tool for science of science research & practice

Email Address

Password

Login

Forgot your password?
To recover your account password, please visit our [password recovery page](#).

Not registered yet?
[Register now](#)

Tutorials
Katy Börner (2010) Science of Science Research and Tools (12 Tutorials). Reporting Branch, Office of Extramural Research/Office of the Director, National Institutes of Health, Bethesda, MD.

- Tutorial #01: [Science of Science Research](#)
- Tutorial #02: [Network Science / Information Visualization](#)
- Tutorial #03: [CIShell Powered Tools: Network Workbench and Science of Science Tool](#)
- Tutorial #04: [Temporal Analysis—Burst Detection](#)
- Tutorial #05: [Geospatial Analysis and Mapping](#)
- Tutorial #06: [Topical Analysis & Mapping](#)
- Tutorial #07: [Tree Analysis and Visualization](#)
- Tutorial #08: [Network Analysis and Visualization](#)
- Tutorial #09: [Large Network Analysis and Visualization](#)
- Tutorial #10: [Using the Scholarly Database at IU](#)
- Tutorial #11: [VIVO National Researcher Networking](#)
- Tutorial #12: [Future Developments](#)

<http://sci2.cns.indiana.edu>
<http://sci2.wiki.cns.indiana.edu>

Geetha Senthil (2010). [Multidisciplinary Nature of Work With Reference to PIs and ICs Within a Portfolio](#). PA Group at NIH.

NIH Office of Extramural Research and Katy Börner (2010) [Network Visualizations Using SPIRES Data and the Sci2 Tool](#). Office of Extramural Research at NIH.

EpiC Tool
File | Compartmental Modeling | Networks | Simulation | Visualization | R | Help

Welcome to the EpiC tool, which supports the modeling, analysis, and visualization of epidemic processes.

The EpiC project (<http://epic.sls.indiana.edu>) is supported in part by the NIH RM-07-004 award. The primary investigators are Dr. Katy Börner, Dr. Alessandro Vespignani, and Dr. Jim Sherman.

Please cite as follows:
EpiC Team. (2009). EpiC Tool. Indiana University.

File
Create a compartmental model
Edit compartmental model

Simulation
Single-Population
Exact
Network

Visualization
Line Graph

R | Help
Create an R Instance
Run Rgui
Import Table Into R
Export Table From R

EpiC
cyberinfrastructure for NETWORK SCIENCE CENTER
CIShell Powered

A number of other projects recently adopted OSGi and/or CIShell:

- USA**
- *Cytoscape* (<http://cytoscape.org>) Led by Trey Ideker at the University of California, San Diego is an open source bioinformatics software platform for visualizing molecular interaction networks and integrating these interactions with gene expression profiles and other state data (Shannon et al., 2002).
 - *MAEviz* (<https://wiki.ncsa.uiuc.edu/display/MAE/Home>) Managed by Jong Lee at NCSA is an open-source, extensible software platform which supports seismic risk assessment based on the Mid-America Earthquake (MAE) Center research.
- Europe**
- *Taverna Workbench* (<http://taverna.org.uk>) Developed by the myGrid team (<http://mygrid.org.uk>) led by Carol Goble at the University of Manchester, U.K. is a free software tool for designing and executing workflows (Hull et al., 2006). Taverna allows users to integrate many different software tools, including over 30,000 web services.
 - *TEXTrend* (<http://textrend.org>) Led by George Kampis at Eötvös Loránd University, Budapest, Hungary supports natural language processing (NLP), classification/mining, and graph algorithms for the analysis of business and governmental text corpuses with an inherently temporal component.
 - *DynaNets* (<http://www.dynanets.org>) Coordinated by Peter M.A. Sloot at the University of Amsterdam, The Netherlands develops algorithms to study evolving networks.
 - *SISOB* (<http://sisob.lcc.uma.es>) An Observatory for Science in Society Based in Social Models.
- As the functionality of OSGi-based software frameworks improves and the number and diversity of dataset and algorithm plugins increases, the capabilities of custom tools will expand.

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Computational Scientometrics Cyberinfrastructures



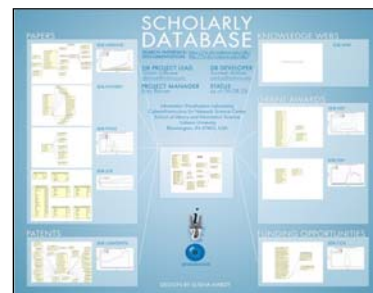
Scholarly Database: 25 million scholarly records

<http://sdb.cns.iu.edu>



VIVO Research Networking

<http://vivoweb.org>



Information Visualization Cyberinfrastructure

<http://iv.cns.iu.edu>



Network Workbench Tool & Community Wiki

<http://nwb.cns.iu.edu>

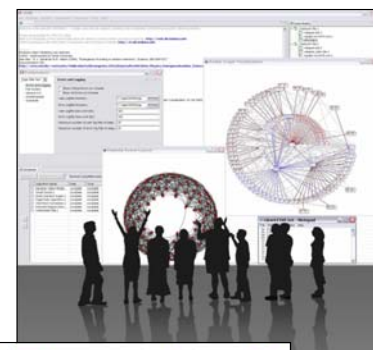


Science of Science (Sci²) Tool

<http://sci2.cns.iu.edu>



Epidemics Tool & Marketplace
Forthcoming



Supports federated search of 25 million publication, patent, grant records.

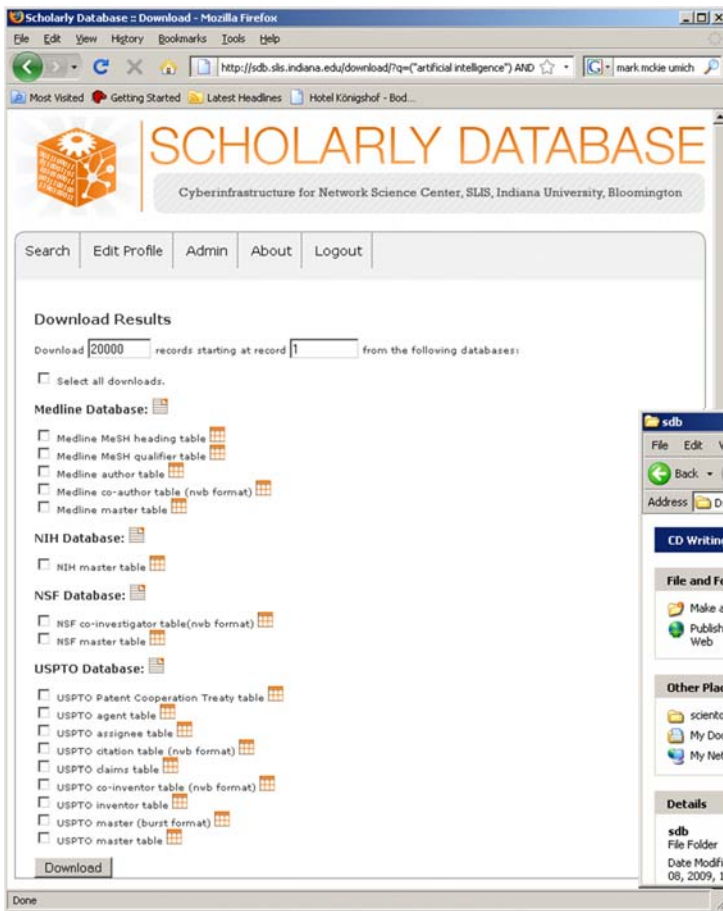
Results can be downloaded as data dump and (evolving) co-author, paper-citation networks.

The image shows two screenshots of the Scholarly Database interface. The left screenshot displays the login page with options for 'IU User' and 'Non-IU User'. The right screenshot shows the search interface with various filters and a search button.

Register for free access at <http://sdb.cns.iu.edu>

The image is a screenshot of a Mozilla Firefox browser window displaying the Scholarly Database search results for the query "artificial intelligence". The page shows a list of results with columns for Source, Authors/Creators, Year, Title, and Score (out of 5.71). A 'Download' button is visible above the results list.

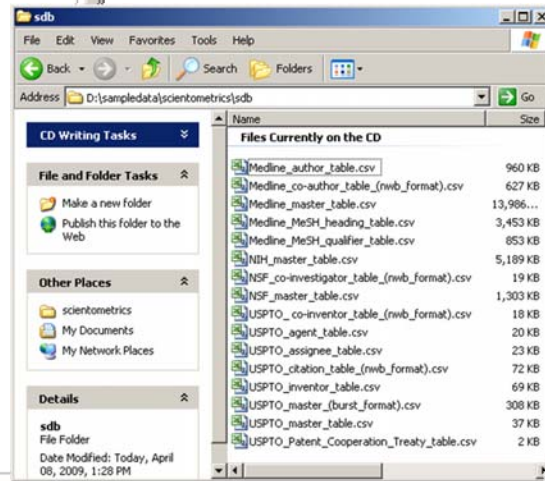
Source	Authors/Creators	Year	Title	Score (out of 5.71)
Medline	LaCombe	1987	Artificial intelligence.	5.71
Medline		1989	Artificial intelligence: expert systems.	5.71
Medline	Schmitt	1990	[Artificial intelligence in dentistry]	5.71
Medline	Adlassnig and Adlassnig	2002	Artificial-intelligence-augmented systems.	5.60
Medline	Touretzky	1980	Artificial intelligence.	4.86
Medline	Goldenberg	1980	Artificial intelligence.	4.86



Since March 2009:

Users can download networks:

- Co-author
 - Co-investigator
 - Co-inventor
 - Patent citation
- and tables for burst analysis in NWB.



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CTSI Accelerating Science Core

The core provides consulting, data mining, and visualization of information on the current practice of science to accelerate science and competitive research using a network science and science mapping approach.

Findings from theory-based research on the formation of productive teams, the identification of trends and emerging ideas, and the effective communication of complex results to diverse stakeholders are used to optimize science itself.

The Accelerating Science Core provides integrative analyses of relationships in support of institutes, programs, and projects, interested to accelerate the translation of scientific results to the improvement of human health.

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CTSI Accelerating Science Core—Services Offered

Evaluation & Monitoring: Impact and/or strength analysis for a lab, center (e.g., NSF STCs or NIH CTSA), institution, or region in order to evaluate, plan, or implement research efforts. Relevant data must be provided.

\$2000-\$6000*

Data Compilation: The construction of a custom data set (e.g., all papers, patents, grants for a certain institution or area of research) using the Scholarly Database (<http://sdb.cns.iu.edu>).

\$3000*

Visual Interface to Community Data: Setting up an online interactive interface similar to <http://mapsustain.cns.iu.edu> (relevant data must be provided to the Core).

\$6000*

83

Accelerating Science Core—Services Offered

VIVO Researcher Networking: Design and implementation of interactive custom VIVO visualizations (see <http://vivoweb.org> for more info on VIVO and <http://vivo.iu.edu/vis/map-of-science/BL-ARSC> for a map of science visualization).

\$5000*

Training and Consulting in Data Mining and Visualization:

Introduction of advanced data mining and visualization tools: 2-hour tutorials or 4-hour tutorials that also feature exemplary analyses of client data. See <http://sci2.cns.iu.edu/user/documentation.php> for sample slides.

\$2000-\$5000*

**Prices vary according to scope of work. Please contact us to request an estimate.*

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All papers, maps, tools, talks, press are linked from <http://cns.iu.edu>

CNS Facebook: <http://www.facebook.com/cnscenter>

Mapping Science Exhibit Facebook: <http://www.facebook.com/mappingscience>