Science of Science Research and Tools
Tutorial #04 of 12

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With special thanks to Kevin W. Boyack, Micah Linnemeier, Russell J. Duhon, Patrick Phillips, Joseph Biberstine, Chintan Tank Nianli Ma, Hanning Guo, Mark A. Price, Angela M. Zoss, and Scott Weingart

Invited by Robin M. Wagner, Ph.D., M.S.
Chief Reporting Branch, Division of Information Services
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Office of the Director, National Institutes of Health

Suite 4090, 6705 Rockledge Drive, Bethesda, MD 20892
10a-noon, July 12, 2010

12 Tutorials in 12 Days at NIH—Overview

1. Science of Science Research — **1st Week**
2. Information Visualization
3. CIShell Powered Tools: Network Workbench and Science of Science Tool

4. **Temporal Analysis—Burst Detection** — **2nd Week**
5. **Geospatial Analysis and Mapping**
6. **Topical Analysis & Mapping**

7. **Tree Analysis and Visualization** — **3rd Week**
8. **Network Analysis**
9. **Large Network Analysis**

10. **Using the Scholarly Database at IU** — **4th Week**
11. **VIVO National Researcher Networking**
12. **Future Developments**

12 Tutorials in 12 Days at NIH—Overview

[#04] Temporal Analysis—Burst Detection

- Science of Science (Sci2) Tool *(left over from Tutorial #3)*
- Temporal Analysis Overview
- Designing Effective Charts
- Sci2-Horizontal Bar Charts
- Sci2-Burst Analysis and Visualization
- Outlook
- Exercise: Identify Promising Temporal Analyses of NIH Data

Recommended Reading

- Information Visualization Cyberinfrastructure > Learning Modules > Visualizing Time Series Data, http://iv.slis.indiana.edu/lm/lm-time-series.html
- NWB Team (2009) Network Workbench Tool, User Manual 1.0.0, http://nwb.slis.indiana.edu/Docs/NWBTool-Manual.pdf
- Scott Weingart, Hanning Guo, Katy Borner, Kevin W. Boyack, Micah W. Linnemeier, Russell J. Duhon, Patrick A. Phillips, Chintan Tank, and Joseph Biberstine (2010) Science of Science (Sci2) Tool User Manual. Cyberinfrastructure for Network Science Center, School of Library and Information Science, Indiana University, Bloomington. http://sci.slis.indiana.edu/registration/docs/Sci2_Tutorial.pdf

12 Tutorials in 12 Days at NIH—Overview

[#05] Geospatial Analysis and Mapping

- General Overview
- Designing Effective Geomaps
- Sci2-Geomaps With Circle and Colored Region Annotation
- Sci2-Animations
- Geographic Information Systems (GIS)
- Outlook
- Exercise: Identify Promising Geospatial Analyses of NIH Data

Recommended Reading

- NWB Team (2009) Network Workbench Tool, User Manual 1.0.0, http://nwb.slis.indiana.edu/Docs/NWBTool-Manual.pdf
- Scott Weingart, Hanning Guo, Katy Borner, Kevin W. Boyack, Micah W. Linnemeier, Russell J. Duhon, Patrick A. Phillips, Chintan Tank, and Joseph Biberstine (2010) Science of Science (Sci2) Tool User Manual. Cyberinfrastructure for Network Science Center, School of Library and Information Science, Indiana University, Bloomington. http://sci.slis.indiana.edu/registration/docs/Sci2_Tutorial.pdf

12 Tutorials in 12 Days at NIH—Overview

[#06] Topical Analysis & Mapping

- General Overview
- Designing Effective Topic Maps
- Sci2-Term Co-Occurrence Analysis and Networks
- Sci2-Science Maps With Circle Annotation
- Sci2-Animations
- Outlook
- Exercise: Identify Promising Geospatial Analyses of NIH Data

Recommended Reading

- NWB Team (2009) Network Workbench Tool, User Manual 1.0.0, http://nwb.slis.indiana.edu/Docs/NWBTool-Manual.pdf
- Scott Weingart, Hanning Guo, Katy Borner, Kevin W. Boyack, Micah W. Linnemeier, Russell J. Duhon, Patrick A. Phillips, Chintan Tank, and Joseph Biberstine (2010) Science of Science (Sci2) Tool User Manual. Cyberinfrastructure for Network Science Center, School of Library and Information Science, Indiana University, Bloomington. http://sci.slis.indiana.edu/registration/docs/Sci2_Tutorial.pdf

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Science of Science (Sci2) Tool

http://sci.slis.indiana.edu

- Explicitly designed for SoS research and practice, well documented, easy to use.
- Empowers many to run common studies while making it easy for exports to execute novel research.
- Advanced algorithms, effective visualizations, and many (standard) workflows.
- Supports detailed documentation and replication of studies.
- Is open source—anybody can review and extend the code, or use it for commercial purposes.

nature

Vol 464|25 March 2010

OPINION

SUMMARY

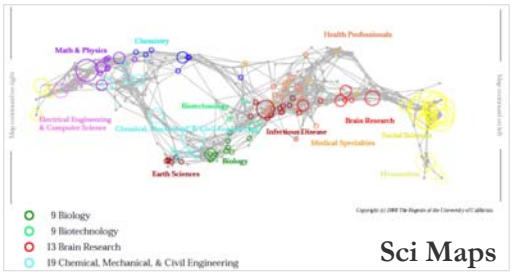
- Existing metrics have known flaws
- A reliable, open, joined-up data infrastructure is needed
- Data should be collected on the full range of scientists' work
- Social scientists and economists should be involved

Let's make science metrics more scientific

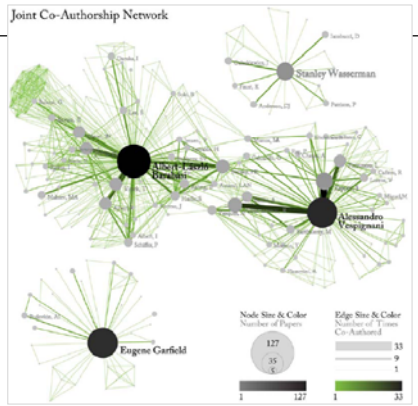
To capture the essence of good science, stakeholders must combine forces to create an open, sound and consistent system for measuring all the activities that make up academic productivity, says **Julia Lane**.

Sci² Tool – "Open Code for S&T Assessment"

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



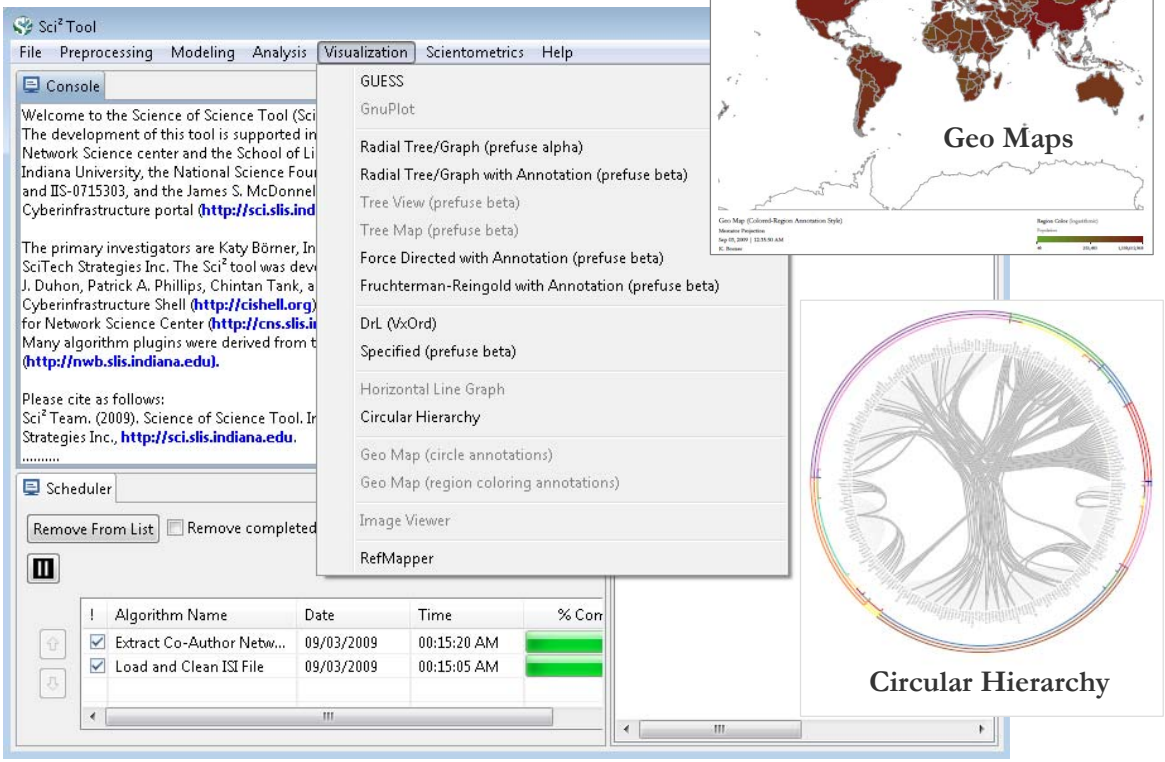
Sci Maps



GUESS Network Vis

Börner, Katy, Huang, Weixia (Bonnie), Linnemeier, Micah, Duhon, 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



Sci² Tool: Algorithms

See https://nwb.slis.indiana.edu/community

Preprocessing
Extract Top N% Records
Extract Top N Records
Normalize Text
Slice Table by Line

Extract Top Nodes
Extract Nodes Above or Below Value
Delete Isolates

Extract top Edges
Extract Edges Above or Below Value
Remove Self Loops
Trim by Degree
MST-Pathfinder Network Scaling
Fast Pathfinder Network Scaling

Snowball Sampling (in nodes)
Node Sampling
Edge Sampling

Symmetrize
Dichotomize
Multipartite Joining

Geocoder

Extract ZIP Code

Modeling
Random Graph
Watts-Strogatz
Small World
Barabási-Albert Scale-Free
TARL

Analysis
Network Analysis Toolkit (NAT)
Unweighted & Undirected
- Node Degree
- Degree Distribution
- ---
- K-Nearest Neighbor (Java)
- Watts-Strogatz Clustering Coefficient
- Watts Strogatz Clustering Coefficient over K
- ---
- Diameter
- Average Shortest Path
- Shortest Path Distribution
- Node Betweenness Centrality
- ---
- Weak Component Clustering
- Global Connected Components
- ---
- Extract K-Core
- Annotate K-Coreness
- ---
- HITS

Weighted & Undirected
- Clustering Coefficient
- Nearest Neighbor Degree
- Strength vs Degree
- Degree & Strength
- Average Weight vs End-point Degree
- Strength Distribution
- Weight Distribution
- Randomize Weights
- ---
- Blondel Community Detection
- ---
- HITS

Unweighted & Directed
- Node Indegree
- Node Outdegree
- Indegree Distribution
- Outdegree Distribution
- ---
- K-Nearest Neighbor
- Single Node in-Out Degree Correlations
- ---
- Dyad Reciprocity
- Arc Reciprocity
- Adjacency Transitivity
- ---
- Weak Component Clustering
- Strong Component Clustering
- ---

Sci² Tool: Algorithms cont.

See https://nwb.slis.indiana.edu/community

Extract K-Core
Annotate K-Coreness

HITS
PageRank

Weighted & Directed
HITS
Weighted PageRank

Textual
Burst Detection

NEW:
Database support for ISI and NSF data.

Visualization
GnuPlot
GUESS
Image Viewer

Radial Tree/Graph (prefuse alpha)
Radial Tree/Graph with Annotation (prefuse beta)
Tree View (prefuse beta)
Tree Map (prefuse beta)
Force Directed with Annotation (prefuse beta)
Fruchterman-Reingold with Annotation (prefuse beta)

DrL (VxOrd)
Specified (prefuse beta)

Horizontal Line Graph
Circular Hierarchy
Geo Map (Circle Annotation Style)
Geo Map (Colored-Region Annotation Style)
***Science Map (Circle Annotation)**

* Requires permission from UCSD
All four+ save into Postscript files.
Automatic legends.

Scientometrics
Remove ISI Duplicate Records
Remove Rows with Multitudinous Fields
Detect Duplicate Nodes
Update Network by Merging Nodes

Extract Directed Network
Extract Paper Citation Network
Extract Author Paper Network

Extract Co-Occurrence Network
Extract Word Co-Occurrence Network
Extract Co-Author Network
Extract Reference Co-Occurrence (Bibliographic Coupling) Network
---
Extract Document Co-Citation Network

See Sci2 Manual, Section 3.1 for details.
http://sci.slis.indiana.edu/registration/docs/Sci2_Tutorial.pdf

Sci² Tool: Download, Install, and Run

Sci² Tool Alpha 3 (March 2010)

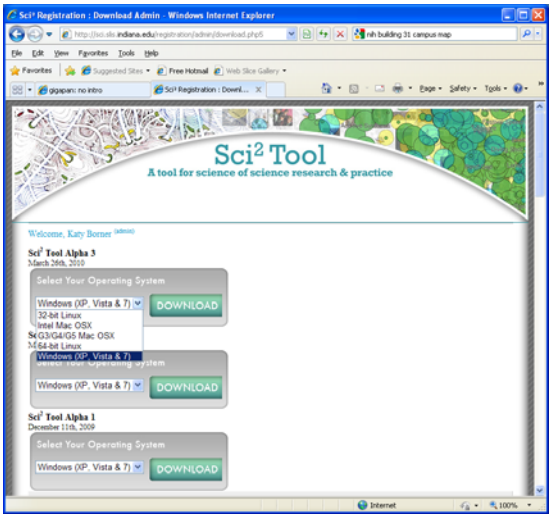
Can be freely downloaded for all major operating systems from
http://sci.slis.indiana.edu/sci2

Select your operating system from the pull down menu and download.

Unpack into a /sci2 directory.

Run /sci2/sci2.exe

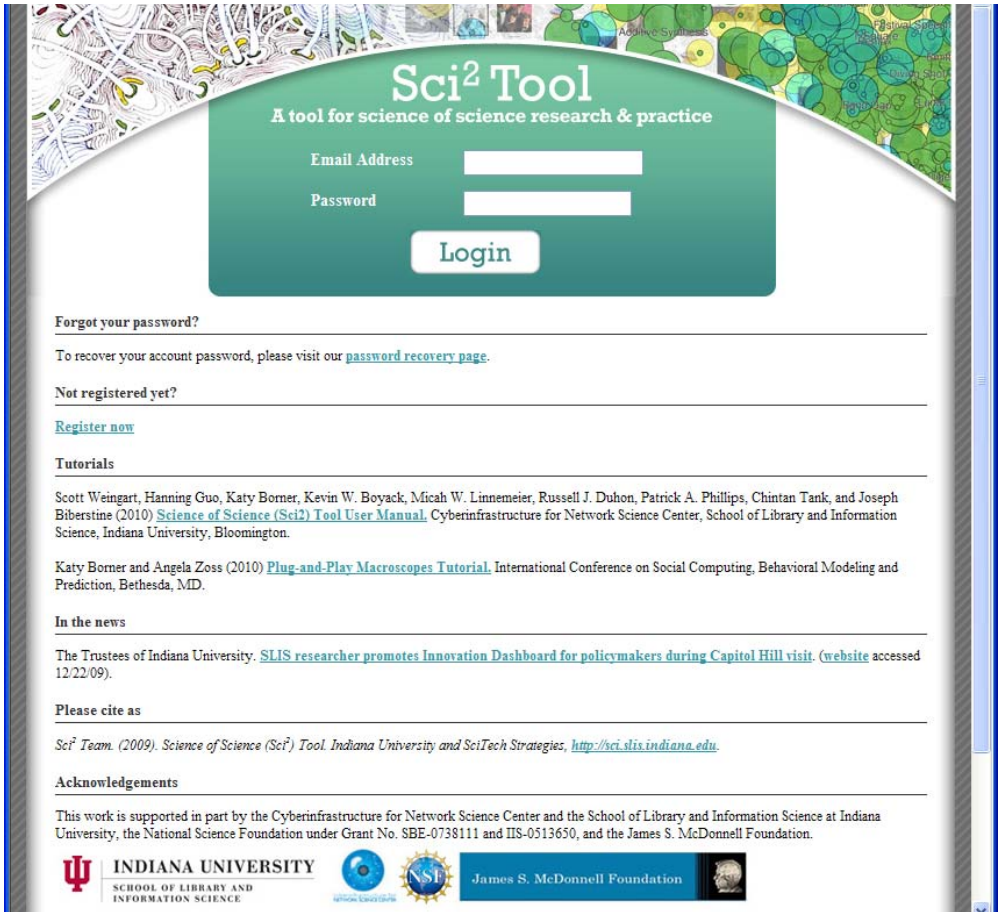
Session log files are stored in '**yournwbdirectory*/logs*' directory.

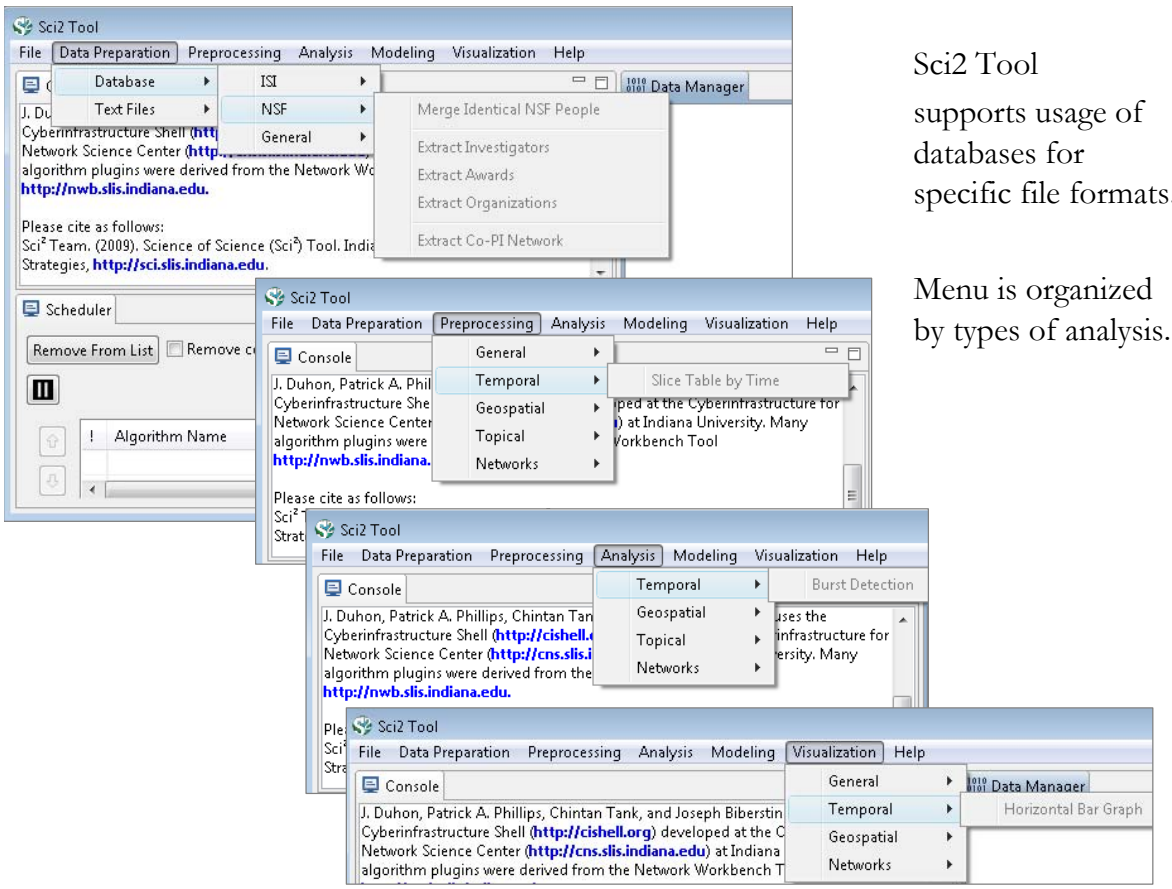


Cite as

Sci² Team. (2009). Science of Science (Sci²) Tool. Indiana University and SciTech Strategies, http://sci.slis.indiana.edu

The file was also made available as sci2-N-1.0.0.201003270106NGT-win32.win32.x86.zip on the computers in the tutorial room.





Sci2 Tool supports usage of databases for specific file formats.

Menu is organized by types of analysis.

[#04] Temporal Analysis—Burst Detection

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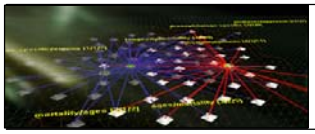


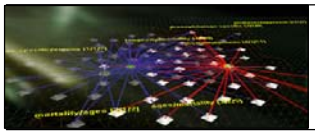
Time Series Analysis and Visualization

Main Goals:

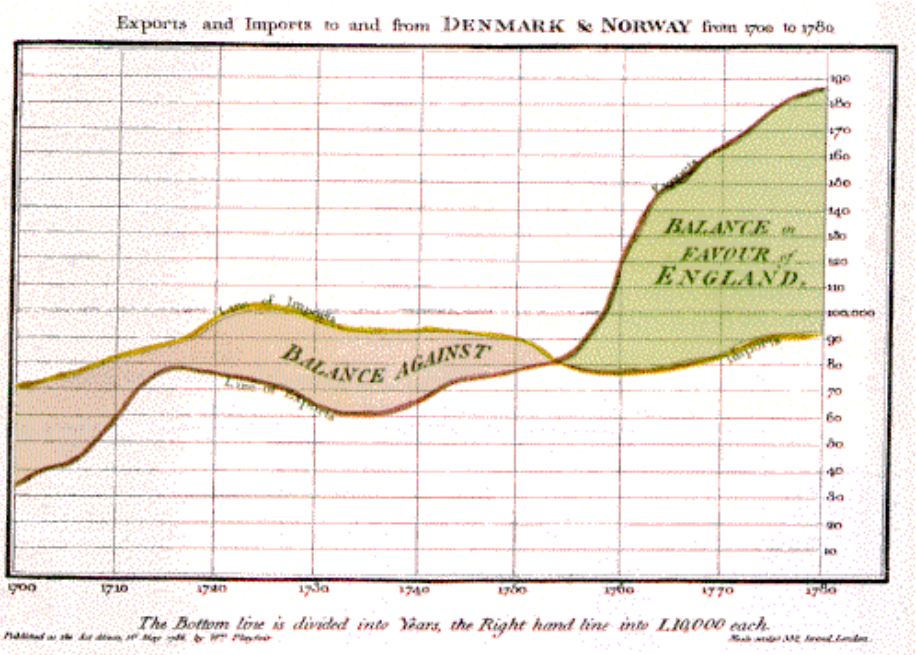
- Identifying the nature of the phenomenon represented by the sequence of observations.
- Forecasting, i.e., predicting future values of the time series variable(s).

Identifying Patterns in Time Series Data

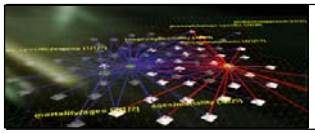
- **Systematic pattern and random noise:** Frequently, some form of filtering is applied to reduce noise in order to make patterns more salient.
- **Two general aspects of time series patterns:** Trend (e.g., increase in spam email) and seasonality (e.g., emails received at night/day).
- **Trend Analysis:** Smoothing (e.g., averaging using a smoothing window of a certain width) and curve approximation/fitting.
- **Burst Analysis**
- Etc.



Balance of Trade Chart by Playfair in 1786

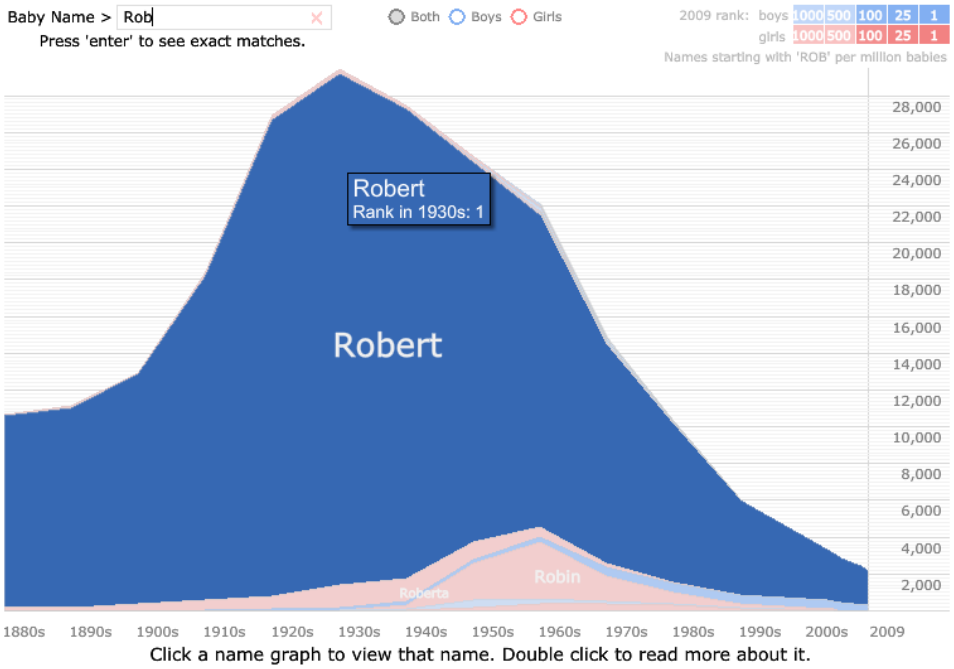


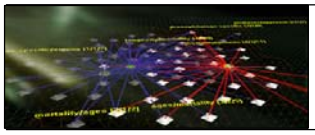
The area between two time-series curves was emphasized to show the difference between them, representing the balance of trade.



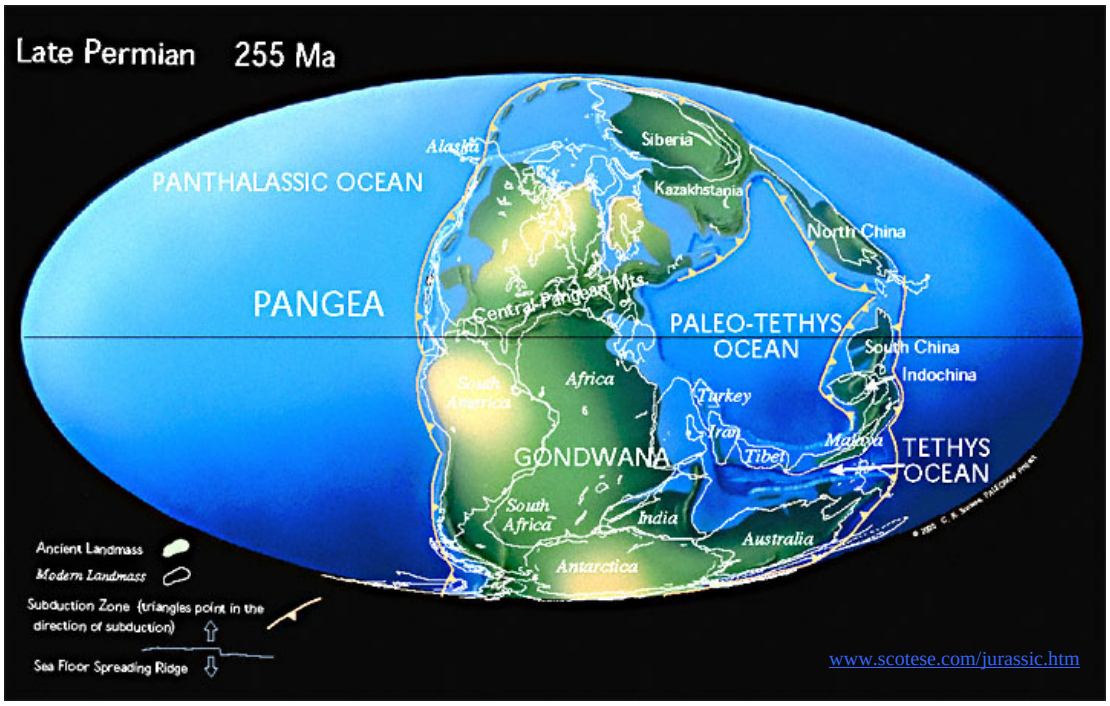
Interactive Baby Name Wizard

http://babynamewizard.com/namevoyager/lnv0105.html

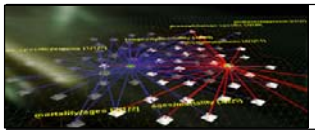


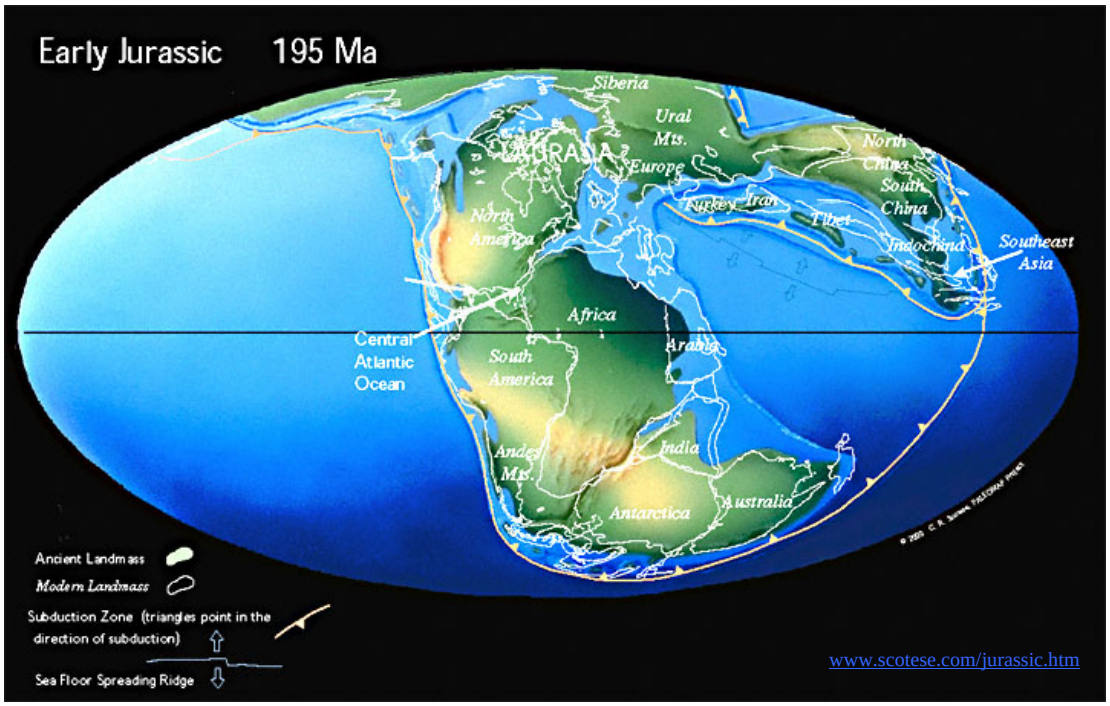


Animation of Tectonic Movement

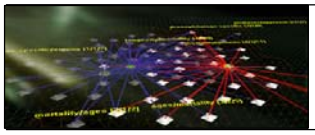


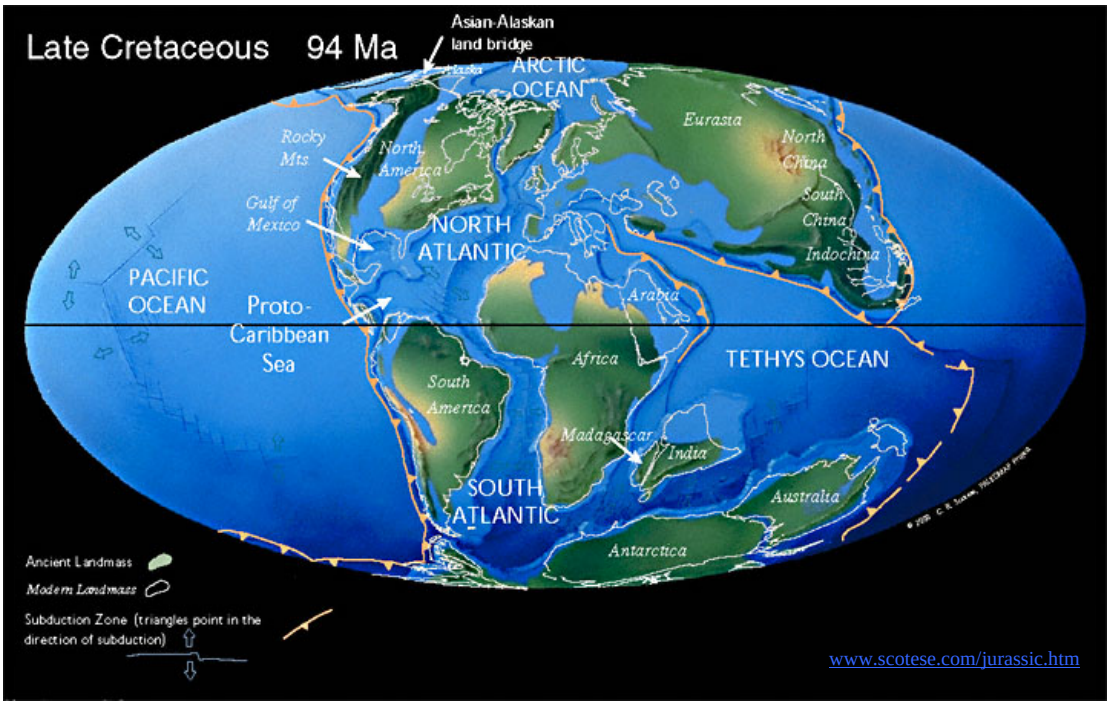
Information Visualization Course, Katy Börner, Indiana University





Information Visualization Course, Katy Börner, Indiana University





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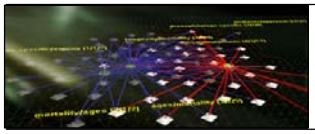
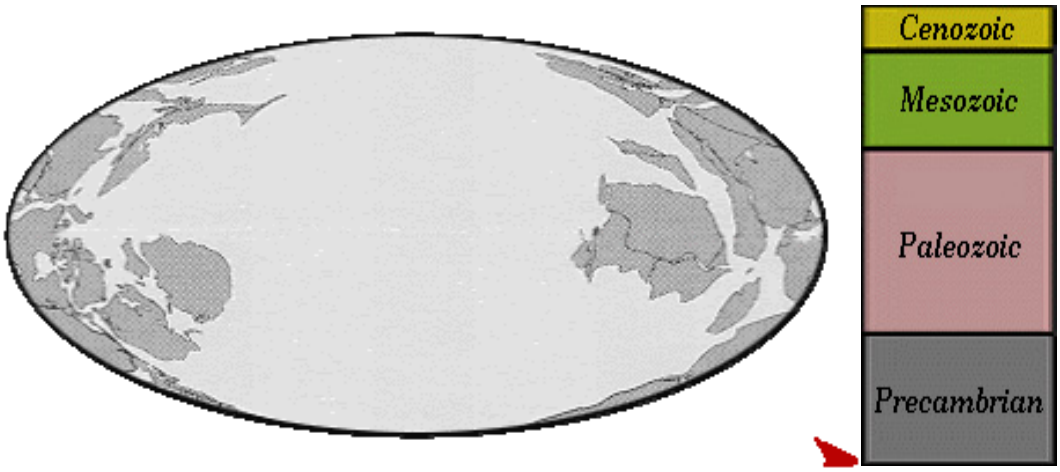
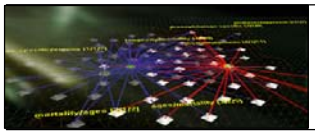


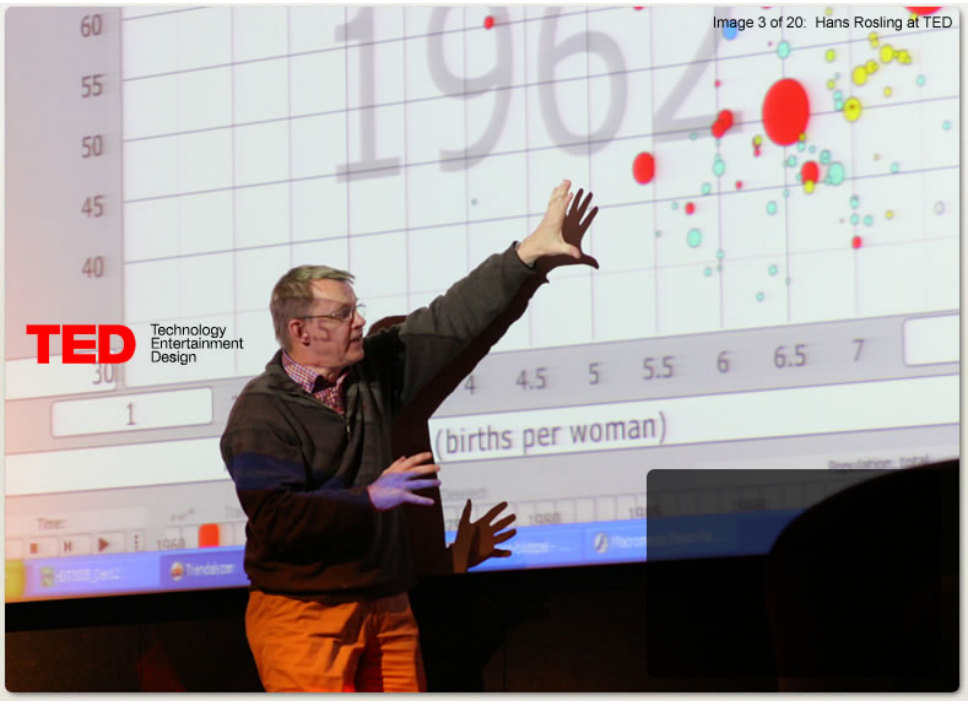
Continental Drift Animation

http://www.ucmp.berkeley.edu/geology/anim1.html





Gapminder presentation by Hans Rosling
http://www.ucmp.berkeley.edu/geology/anim1.html



http://www.ted.com/index.php/talks/hans_rosling_shows_the_best_stats_you_ve_ever_seen.html

[#04] Temporal Analysis—Burst Detection

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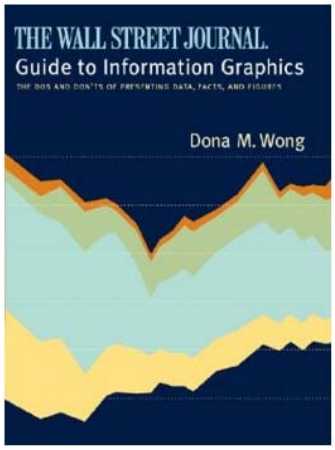
Designing Effective Charts—
Please consult Wong's recent book



In this book, you will learn:

- to choose the best chart that fits your data;
- the most effective way to communicate with decision makers when you have five minutes of their time;
- how to chart currency fluctuations that affect global business;
- how to use color effectively;
- how to make a graphic "colorful" even if only black and white are available.

The book is organized in a series of mini-workshops backed up with illustrated examples, so not only will you learn what works and what doesn't but also you can see the dos and don'ts for yourself. This is an invaluable reference work for students and professional in all fields.

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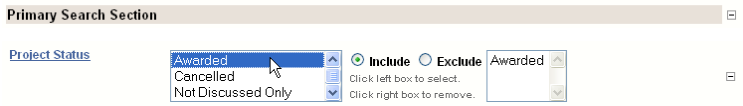
RePORTER Datasets

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES National Institutes of Health

Query View Report System - QVR

QVR Query for MIDAS* Grants

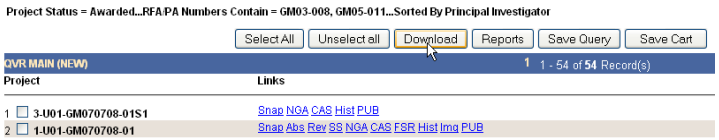
Select awarded grants in the Primary Search section



Enter MIDAS RFA numbers in the application ID section

Execute search

Download hit list



* NIGMS Modeling of Infectious Disease Agent Study

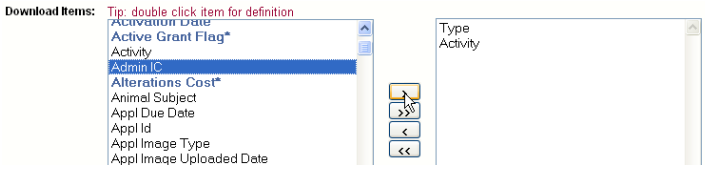
Slide provided by James Onken

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES National Institutes of Health

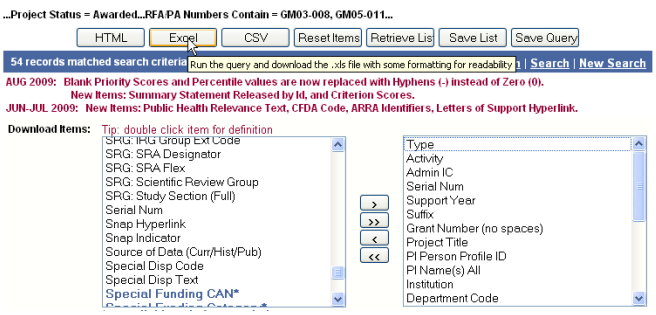
Query View Report System - QVR

QVR Query for MIDAS Grants (Cont'd)

Select data elements



Export to Excel

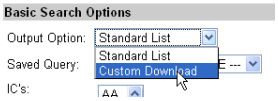


Slide provided by James Onken

SPIRES Query for MIDAS Publications

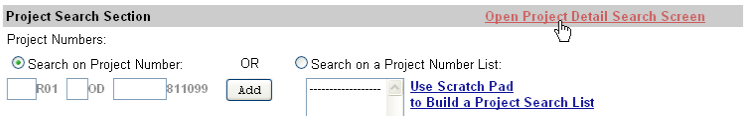
Conduct Publication Search

Select custom download



Clear your IC from selection box (if necessary)

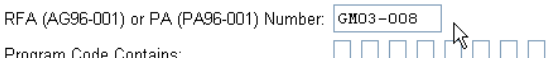
Open Project Detail Search Screen



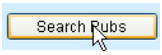
Slide provided by James Onken

SPIRES Query for MIDAS Publications (cont'd)

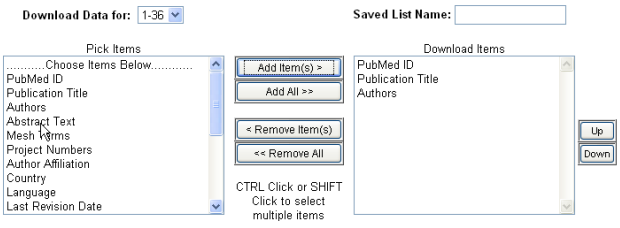
Enter MIDAS RFA Number



Search Publications



Select data elements



Download Excel file

Repeat process for GM05-011

Slide provided by James Onken

RePORTER Data Preparation

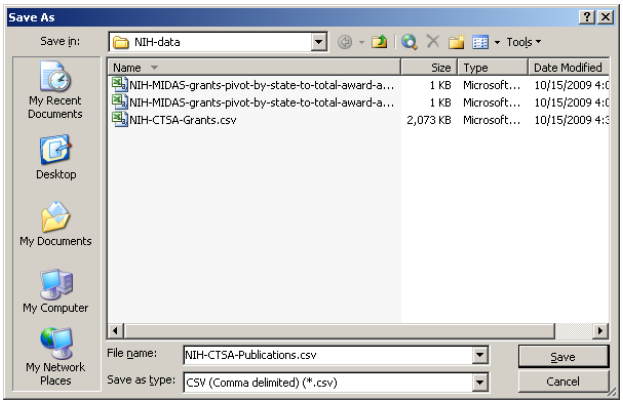
Open NIH*.xls in MS Excel.

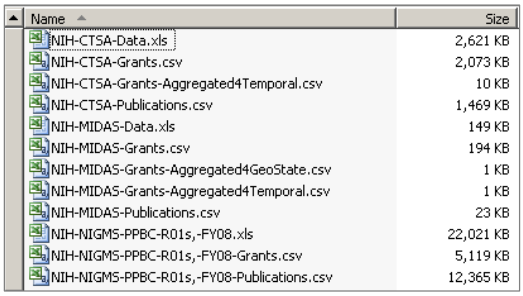
It contains two worksheets: 'Grants' and 'Publications'.

Save both worksheets separately as CSV (comma delimited) files, e.g.,

Grants.csv

Publications.csv





Get data files from Memory Stick

RePORTER Data Format: Grants

Data Fields:

- Application ID Full Project Number (including subproject ID)
- **Project ID**
- Type
- Activity
- Administering IC
- Serial Number
- Support Year
- Suffix
- Subproject ID
- Study Section
- Study Section Name
- **RFA/PA Number**
- Project/Subproject Title
- Funding IC(s)
- FY Total Costs
- Fiscal Year of Funding
- Budget start date
- Budget end date
- Project start date
- Project end date
- Organization Name
- Organization Department
- Organization City
- Organization State
- Country Name
- Organization FIPS Country Code
- Congressional District
- **DUNS Number**
- **Contact PI ID**
- PI(s) Name
- IC Name
- Abstract
- Public health relevance
- Project term descriptions
- NIH reporting categories

Unique IDs are bolded

Temporal Analysis

Geospatial Analysis (also zip code

Topical Analysis (see also Title, RCDC categories)

Network Analysis

Project Attributes (ideally also award total costs)

RePORTER Data Format: Publications

Data Fields:

- **Application ID**
- **Project ID**
- **PubMed ID**
- Publication Title
- Authors
- **ISSN**
- Journal Title Abbr
- Journal Volume
- Journal Issue
- Page Number
- Publish Date
- Mesh Terms

Unique IDs are bolded

Temporal Analysis

Geospatial Analysis (also zip code

Topical Analysis (see also Title, RCDC categories)

Network Analysis

Project Attributes (Times Cited via Web of Science)

RePORTER Data Format: Grants and Publications

CTSA Project RR024126 has 4 Grant records and 7 Publication records

NIH-CTSA-Grants.csv

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Application	Full Project Number	Project ID	Type	Activit	Admi	Serial N	Supp	Suffi	Sub	Study	Study Se	RFA/PA N	Project/Sub	Fund	FY Total (	Fiscal Y	Budget st	Budget
2	9005172	1TL1RR024126-01	RR024126	1	TL1	RR	24126	1	-	-	ZRR1	NCRR Spe	RM06-002	Duke CTSI	OD	436094	2006	9/30/2006	6/30/20
3	9496472	5TL1RR024126-02	RR024126	5	TL1	RR	24126	2	-	-	ZRR1	NCRR Spe	RM06-002	Duke CTSI	OD	454560	2007	7/1/2007	6/30/20
4	8901871	5TL1RR024126-03	RR024126	5	TL1	RR	24126	3	-	-	ZRR1	NCRR Spe	RM06-002	Duke CTSI	OD	429574	2008	7/1/2008	6/30/20
5	7482476	5TL1RR024126-04	RR024126	5	TL1	RR	24126	4	-	-	ZRR1	NCRR Spe	RM06-002	Duke CTSI	OD	405098	2009	7/1/2009	6/30/20
6	9005572	1KL2RR024127-01	RR024127	1	KL2	RR	24127	1	-	-	ZRR1	NCRR Spe	RM06-002	Duke CTSI	RR	619578	2006	9/30/2006	6/30/20
7	9496072	5KL2RR024127-02	RR024127	5	KL2	RR	24127	2	-	-	ZRR1	NCRR Spe	RM06-002	Duke CTSI	RR	826104	2007	7/1/2007	6/30/20
8	8951374	5KL2RR024127-03	RR024127	5	KL2	RR	24127	3	-	-	ZRR1	NCRR Spe	RM06-002	Duke CTSI	OD	768665	2008	7/1/2008	6/30/20
9	7482276	5KL2RR024127-04	RR024127	5	KL2	RR	24127	4	-	-	ZRR1	NCRR Spe	RM06-002	Duke CTSI	OD	805799	2009	7/1/2009	6/30/20
10	9005772	1UL1RR024128-01	RR024128	1	UL1	RR	24128	1	-	-	ZRR1	NCRR Spe	RM06-002	Duke CTSI	RR	7344678	2006	9/30/2006	6/30/20
11	9596072	5UL1RR024128-02	RR024128	5	UL1	RR	24128	2	-	-	ZRR1	NCRR Spe	RM06-002	Duke CTSI	RR	9532522	2007	7/1/2007	6/30/20
12	8894574	5UL1RR024128-03	RR024128	5	UL1	RR	24128	3	-	-	ZRR1	NCRR Spe	RM06-002	Duke CTSI	RR	9138321	2008	7/1/2008	6/30/20

4

NIH-CTSA-Publications.csv

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Application ID	Project ID	PubMed ID	Publication Title	Authors	ISSN	Journal T	Journal V	Journal Is	Page Nun	Publish D	Mesh Terms	
2	9005172	RR024126	18544640	Relationships between	Durheim, M	0193-1849	Am J Phys	295	2	E407-12	2008 Aug	Adult; Aged; Dyslipide	
3	9005172	RR024126	18691766	Temporal lobe volume i	Jones, Lin	1573-2517	J Affect Di	114	39816	50-7	2009 Apr	Adult; Age Factors; A	
4	9005172	RR024126	18989240	Traumatic lumbar punc	Greenberg	0891-3668	Pediatr Infe	27	12	1047-51	2008 Dec	Cerebrospinal Fluidcyt	
5	9005172	RR024126	19188181	Phase II trial of Gliadel	Quinn, Jen	1078-0432	Clin Cance	15	3	1064-8	2009 Feb	Adult; Aged; Antineop	
6	9005172	RR024126	19204199	Phase II trial of temozo	Quinn, Jen	1527-7755	J Clin Onc	27	8	1262-7	2009 Mar	Adult; Aged; Antineop	
7	9005172	RR024126	19326494	Measures of executive	Greene, N	1528-1175	Anesthesic	110	4	788-95	2009 Apr	Aged; Cognitionphysic	
8	9005172	RR024126	19402172	Phase 1 trial of temozo	Quinn, Jen	0008-543X	Cancer	115	13	2964-70	2009 Jul 1	Adult; Aged; Antineop	
9	9005572	RR024127	17342781	Risk for cardiovascular	Inrig, Jula	1555-905X	Clin J Am	2	6	1215-22	2007 Nov	Adult; Age Factors; A	
10	9005572	RR024127	17699456	Predictors of survival af	Pun, Patri	1555-905X	Clin J Am	2	3	491-500	2007 May	Adrenergic beta-Antag	
11	9005572	RR024127	18288540	Racial differences in bl	Bosworth,	1525-1497	J Gen Inter	23	5	692-8	2008 May	Adult; African America	
12	9005572	RR024127	18605915	Unsuspected HIV infec	Hanson, K	1537-6591	Clin Infect	47	3	433-4	2008 Aug	Adolescent; Adult; Ag	
13	9005572	RR024127	18596733	Secondary analysis of	Szczech, I	1523-1755	Kidney Int	74	6	791-8	2008 Sep	Aged; Anemiadrug the	
14	9005572	RR024127	18563051	Negative trials in nephr	Novak, Jar	1523-1755	Kidney Int	74	9	1121-7	2008 Nov	Chronic Disease; Clini	

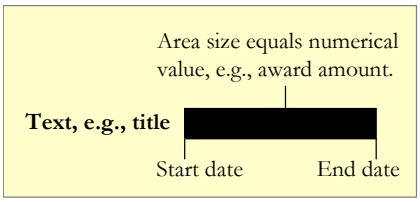
7

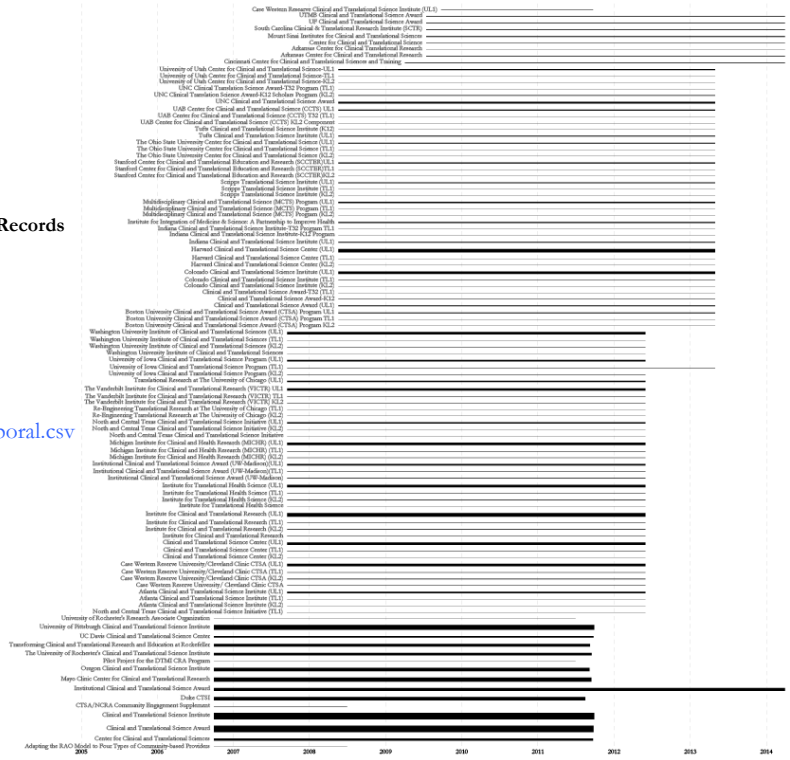
NIH CTSA Grants: Over Time

Grant records with identical title were aggregated.

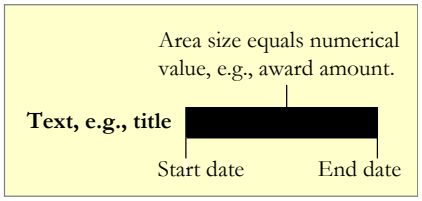
Project/Subproject Title	# Records
Clinical and Translational Science Award	33
Clinical and Translational Science Institute	22
UC Davis CTSA	20
Duke CTSI	19

See NIH-CTSA-Grants-Aggregated4Temporal.csv



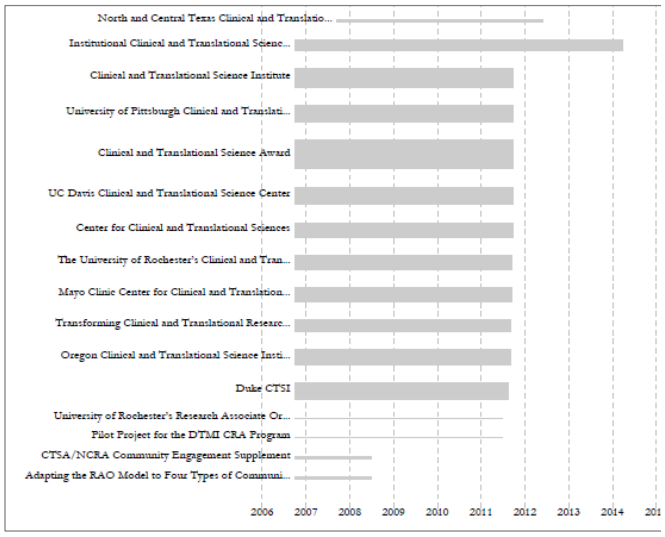


NIH CTSA Grants: Over Time



For a summary of the grants themselves, with a visual representation of their award amount, load the NSF csv file, select it in the Data Manager, and run '*Visualization* > *Temporal* > *Horizontal Bar Graph*', entering the following parameters:

Label Column: Project/Subproject Title
Start Date Column: Earliest Project Start Date
End Date Column: Latest Project End Date
Size By Column: Number aggregated
Date Format Column: Month-Day-Year Date Format
Year Label Font Size: 40.0
Bar Label Font Size: 40.0



The generated postscript file can be saved and viewed using Adobe Distiller or GhostViewer (see Section 2.4 Saving Visualizations for Publication).

[#04] Temporal Analysis—Burst Detection

- Science of Science (Sci2) Tool *(left over from Tutorial #3)*
- Temporal Analysis Overview
- Designing Effective Charts
- Sci2-Horizontal Bar Charts – Using NSF Data – Topic Area
- Sci2-Burst Analysis and Visualization
- Outlook
- Exercise: Identify Promising Temporal Analyses of NIH Data

Biomedical Funding Profile of NSF (NSF Data)

(Sci2 Manual, Section 5.2.4)

MedicalAndHealth.nsf	
Time frame:	2003-2010
Region(s):	Miscellaneous
Topical Area(s):	Biomedical
Analysis Type(s):	NSF Organization-Program Network

What organizations and programs at the National Science Foundation support projects that deal with medical and health related topics? Data was downloaded from the NSF Awards Search SIRE (http://www.nsf.gov/awardsearch) on Nov 23rd, 2009, using the query "medical AND health" in the title, abstract, and awards field, with "Active awards only" checked (see section 4.2.2.1 NSF Award Search for data retrieval details).

Biomedical Funding Profile of NSF (NSF Data)
(section 5.2.4)

Using NSF Awards Search:
http://www.nsf.gov/awardsearch
download relevant NSF awards that have "medical" AND "health" in title, abstract, and awards. Active awards only.

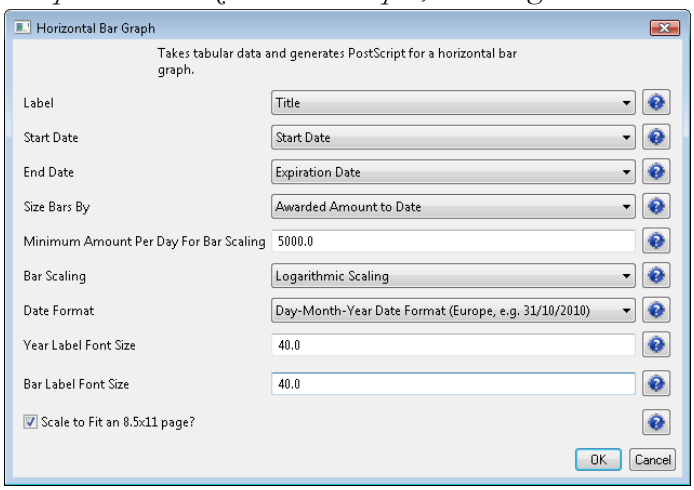
Number of awards: 283 awards
Total awarded amount to date: $152,015,288

File is available in /sampledata/scientometrics/nsf/MedicalAndHealth.nsf

Retrieved on Oct 18, 2009

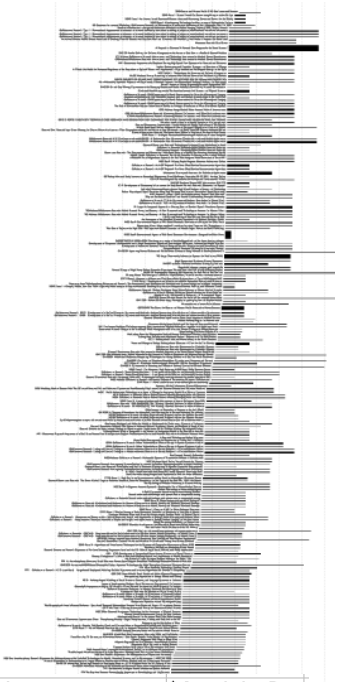
Biomedical Funding Profile of NSF (NSF Data)
(section 5.2.4)

For a summary of the grants themselves, with a visual representation of their award amount, load the NSF csv file, select it in the Data Manager, and run '*Visualization* > *Temporal* > *Horizontal Bar Graph*', entering the following parameters:

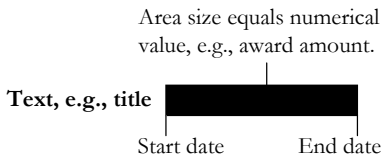


The generated postscript file can be saved and viewed using Adobe Distiller or GhostViewer (see Section 2.4 Saving Visualizations for Publication).

Biomedical Funding Profile of NSF (NSF Data) *(section 5.2.4)*



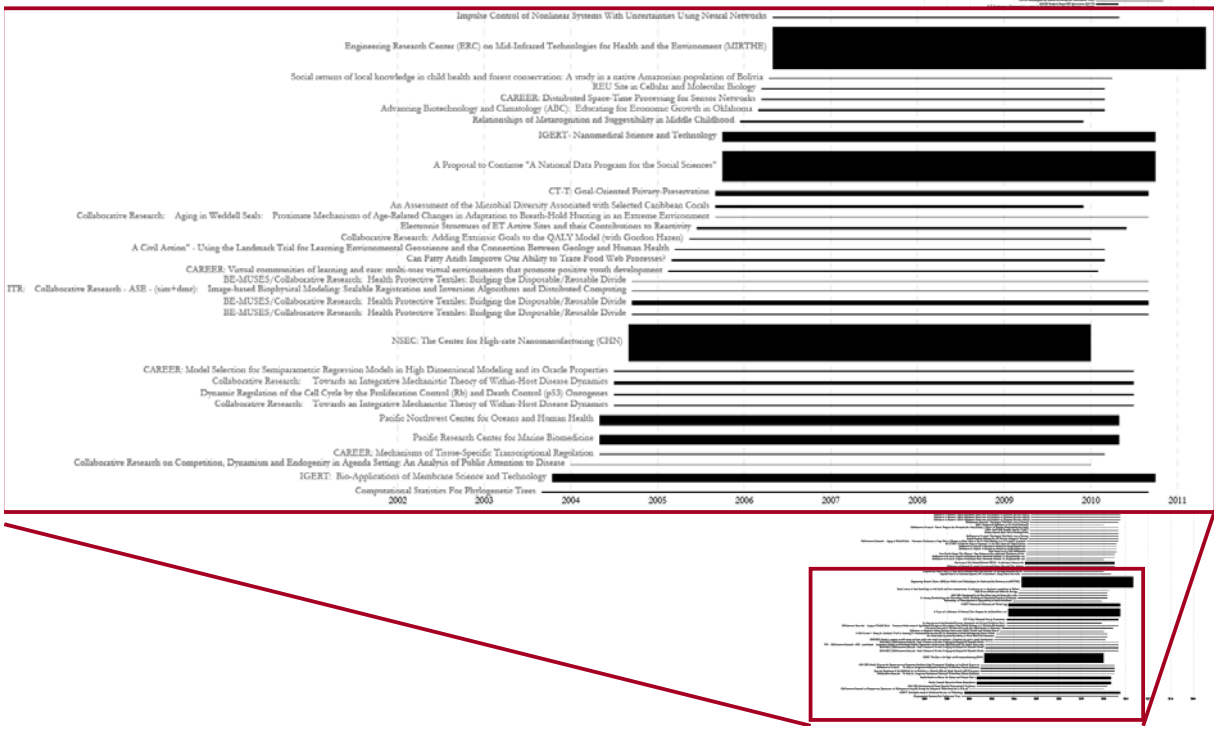
How to read a Horizontal Bar Graph:



Top-10 grants with highest $Awarded to Date:

Title	NSF Org.	Program(s)	PI	State	Organization	$ Awarded to Date
University of NewMexico/Harvard PREM: Leadership in Bi	DMR	PREM|MATERIALS	Lopez, Gabriel	NM	University of New Mexico	2,037,500
TC: Large: Trustworthy Information Systems for Healthcare	CNS	TRUSTWORTHY C	Kotz, David	NH	Dartmouth College	2,999,999
IGERT- Nanomedical Science and Technology	DGE	||||||IGERT FULL PF	Sridhar, Srinivas	MA	Northeastern University	3,323,891
IGERT: Bio-Applications of Membrane Science and Techr	DGE	HUMAN RESOURI	Fried, Joel	OH	University of Cincinnati Main Campu	3,644,410
Pacific Research Center for Marine Biomedicine	OCE	CHEMICAL OCEA	Laws, Edward	HI	University of Hawaii	3,816,943
Pacific Northwest Center for Oceans and Human Health	OCE	CHEMICAL OCEA	Faustman, Elaine	WA	University of Washington	4,026,968
A Proposal to Continue 'A National Data Program for the S	SES	||SCIENCE & ENG	Smith, Tom	IL	National Opinion Research Center	5,835,140
A Proposal to Continue "A National Data Program for the S	SES	||||SCIENCE & EN(	Davis, James	IL	National Opinion Research Center	10,053,668
NSEC: The Center for High-rate Nanomanufacturing (CHN)	EEC	Studies of Policy S	Busnaina, Ahmed	MA	Northeastern University	13,047,758
Engineering Research Center (ERC) on Mid-Infrared Techn	EEC	COLLABORATIVE	Gmachl, Claire	NJ	Princeton University	13,681,994

Biomedical Funding Profile *(section 5.2.4)*



Biomedical Funding Profile of NSF (NSF Data)

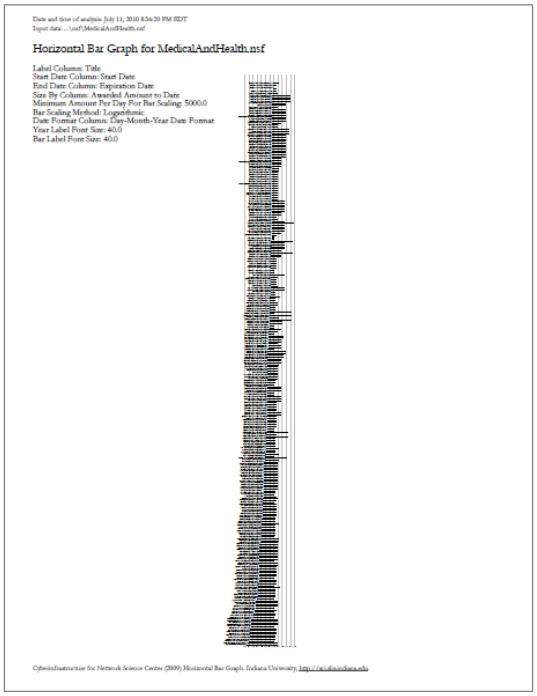
(section 5.2.4)

Change parameter values as needed to achieve legible layout.

Color code bars ti distinguish different award types.

Print in large and hang on wall for very large datasets.

(The one on the right has 283 records)

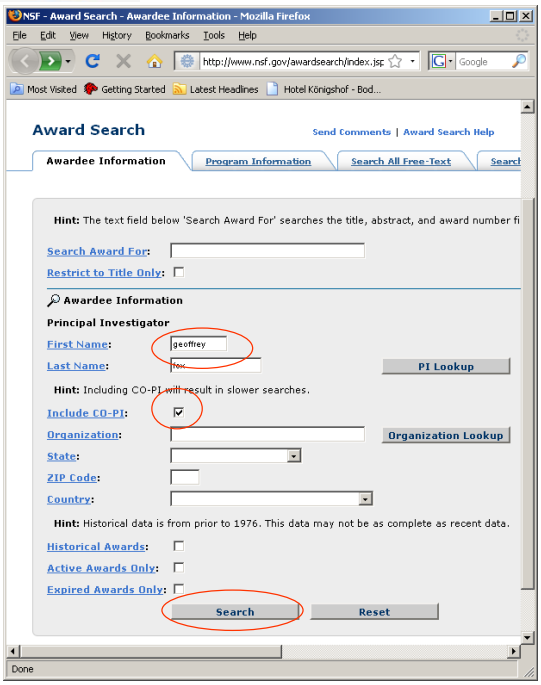


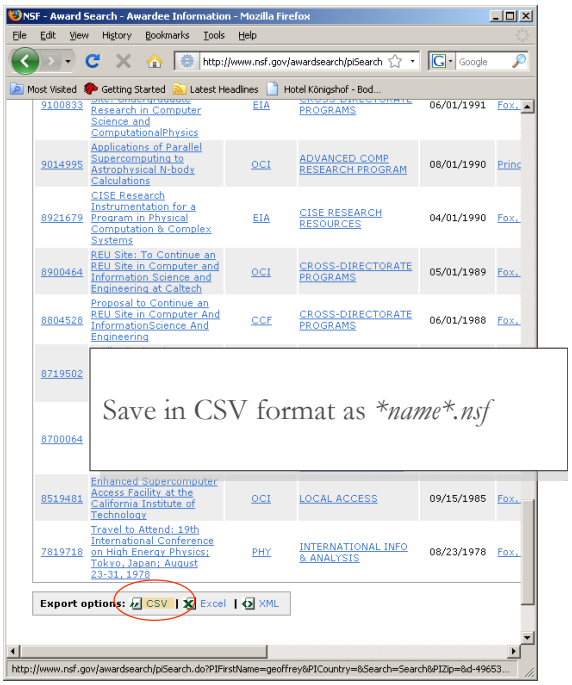
[#04] Temporal Analysis—Burst Detection

- Science of Science (Sci2) Tool *(left over from Tutorial #3)*
- Temporal Analysis Overview
- Designing Effective Charts
- **Sci2-Horizontal Bar Charts – Using NSF Data – Comparing Individual Funding Profiles**
- Sci2-Burst Analysis and Visualization
- Outlook
- Exercise: Identify Promising Temporal Analyses of NIH Data

Mapping Funding Portfolios at the Individual Level

Using NSF Awards Search via http://www.nsf.gov/awardsearch





NSF Awards Search Results

Name	# Awards	First A. Starts	Total Amount to Date
Geoffrey Fox	27	Aug 1978	12,196,260
Michael McRobbie	8	July 1997	19,611,178
Beth Plale	10	Aug 2005	7,224,522

These files are available in /sampledata/scientometrics/nsf/

Disclaimer:

Only NSF funding, no funding in which they were senior personnel, only as good as NSF's internal record keeping and unique person ID. If there are 'collaborative' awards then only their portion of the project (award) will be included.

Comparing Funding Portfolios at the Individual Level

Last Expiration date

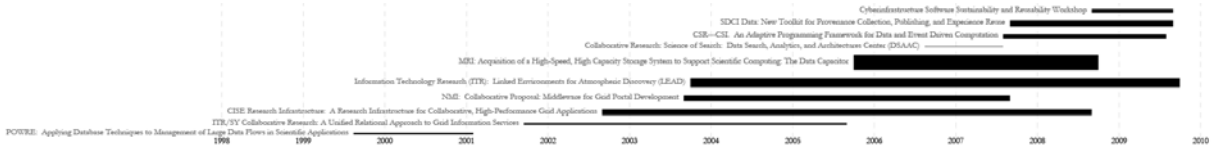
Geoffrey Fox

July 10

Michael McRobbie

Feb 10

Beth Plale



Sept 09

[#04] Temporal Analysis—Burst Detection

- Science of Science (Sci2) Tool *(left over from Tutorial #3)*
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- Sci2-Horizontal Bar Charts
- **Sci2-Burst Analysis and Visualization**
- Outlook
- Exercise: Identify Promising Temporal Analyses of NIH Data

Burst Detection in Scientometrics (ISI Data)

(Sci2 Manual, Section 5.2.6)

Scientometrics.isi	
Time frame:	1978-2008
Region(s):	Miscellaneous
Topical Area(s):	Scientometrics
Analysis Type(s):	Scientometrics

Next, we want to know what topics drive research in scientometrics research and which of these topics and author names experienced a sudden increase in usage frequency over the 31 years this dataset covers. This section demonstrates the application of burst detection described in Section 4.6.1 Burst Detection.

Please see http://sci.slis.indiana.edu/registration/docs/Sci2_Tutorial.pdf, p. 74

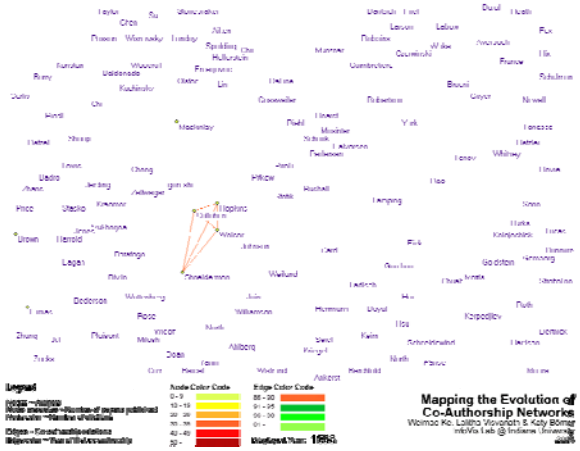
[#04] Temporal Analysis—Burst Detection

- Science of Science (Sci2) Tool *(left over from Tutorial #3)*
- Temporal Analysis Overview
- Designing Effective Charts
- Sci2-Horizontal Bar Charts
- Sci2-Burst Analysis and Visualization
- Sci2-Animations
- Outlook
- Exercise: Identify Promising Temporal Analyses of NIH Data

Outlook

Planned extensions of Sci2 Tool:

- Database support for RePORTER -> merging into 'project buckets', correct time/data formats for subsequent analysis, time slicing.
- Temporal animations, e.g., network overlays for geo maps and science maps.



[#04] Temporal Analysis—Burst Detection

- Science of Science (Sci2) Tool *(left over from Tutorial #3)*
- Temporal Analysis Overview
- Designing Effective Charts
- Sci2-Horizontal Bar Charts
- Sci2-Burst Analysis and Visualization
- Sci2-Animations
- Outlook
- **Exercise: Identify Promising Temporal Analyses of NIH Data**

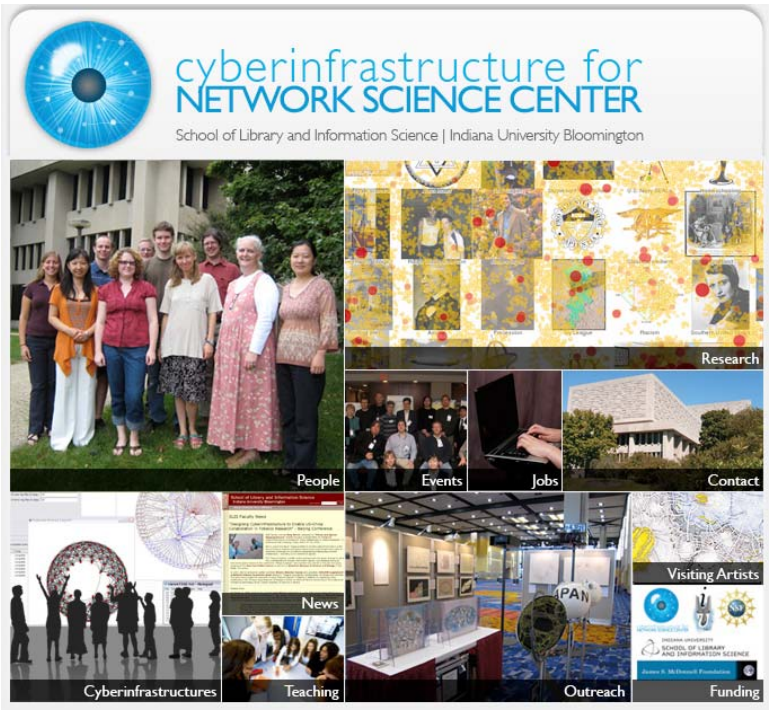
Exercise

Please identify a promising temporal analysis of NIH data.

Document it by listing

- Project title
- User, i.e., who would be most interested in the result?
- Insight need addressed, i.e., what would you/user like to understand?
- Data used, be as specific as possible.
- Analysis algorithms used.
- Visualization generated. Please make a sketch with legend.

Exercise



All papers, maps, cyberinfrastructures, talks, press are linked from http://cns.slis.indiana.edu