STAR METRICS:

Science and Technology for America's Reinvestment:
Measuring the EffecTs of Research on Innovation, Competitiveness and Science

Update and Overview











Outline

- Status Update
- The Jobs Reports
- Level II activities
- Action steps for FDP

Status Update

STAR METRICS is a Federal and University partnership to document outcomes of science investments to the public

- OSTP initiative partnering with NIH, NSF, DOE and EPA; USDA has agreed to join.
- 78 research institutions participating 40% of NSF and NIH portfolio
- Level I: Document the numbers and occupations of workforce supported by ARRA and base budget science spending
- Level II: collaborative development of measures of the impact of federal science investments on
 - scientific knowledge (such as publications and citations..)
 - economic growth (through patents, firm start ups and other measures)
 - workforce outcomes (through student mobility and employment..)
 - social outcomes (such as health and environment...)



Why does STAR METRICS matter to you?

Reduced burden

 Move reporting systems into 21st Century (make your researchers happier!)

Increased quality

 Pull data directly from source data, rather than manual reporting (make your job easier)

Usable information

 Structured data to create analytical information => reports and descriptive tools (make your VP for research happy!)

How much time is involved for the institutions?

FDP Survey of STAR METRICS participants Initial setup time

- Initial participants 20 640 hours; median 100 hours
- Subsequent participants 30 100; median 45
 hours

Subsequent transmissions

- 0-10; median 2.5 hours

STAR METRICS DATA FLOW

STAR METRICS LEVEL 1 RESEARCH INSTITUTION DATA

- •Grant Staff
- •Grant \$ allocation
- Vendors
- Sub-contractors
- •Individual Institution
- Benchmark Data (Level 2)

STAR METRICS LEVELS 1, 2 & 3 INTELLECTUAL CAPITAL

Patents

Publications

Conference Proceedings Blogs, Wikis, News

Other Social Media

STAR METRICS LEVEL 3 ORGANIZATIONS – OTHER

- •Start Ups
- •IPO's
- •Public Performance
- •Company Research

STAR METRICS LEVEL 2 & 3 STAR VISION

•Composite view of all Federal R&D Spending and outputs by geographic distribution – Public facing View

STAR METRICS LEVEL 2 & 3

- •Full CV's
- •Innovation/Expertise Networks
- •Linked In, Facebook,
- Personal Web Sites

STAR METRICS API LAYER



Automated Reporting

Profile



Portfolio Views

- What research is being funded
- Expertise locator



 Geographic description of inputs and outputs of federal investments

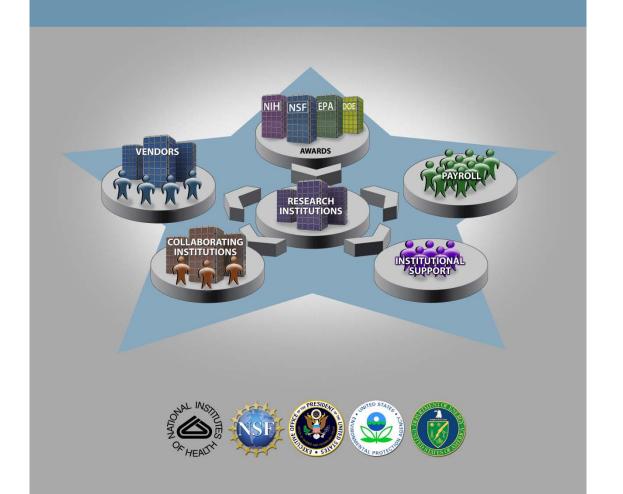


Level I results

- Jobs reports produced for each participating institutions
 - Detailed tables and charts
 - Written report
- Aggregate jobs reports of all participating institutions

Federal Funding for Science, Technology and Jobs

Results from STAR METRICS Research Institutions



Key Results: How many jobs supported

TABLE 1: EMPLOYMENT IN 2011 Q1 ASSOCIATED WITH STAR M	ETRICS RESEARCH INSTITUTIONS
Summary Statistics	Total
Direct Payroll FTEs	
• FTEs	36,594
FTEs per award	1.16
Direct Payroll Individuals	
Number	71,259
Number per award	2.26
Direct Jobs through Vendors, Sub-awards, Institutional Suppo	ort
Number	24,251
Number per award	.77

Key Results:

Industry Distribution For Jobs Supported Through Research Institution Expenditures

TABLE 2: PERCENT OF INDUSTRY DISTRIBUTION FOR JOBS SUPPORTED THROUGH RESEARCH INSTITUTION PROCUREMENT (VENDORS AND SUB-AWARDS – FOR INDUSTRIES REPORTED)

Industry	Sub-Awards	Vendors
Educational Services	72.6%	1.9%
Health Care and Social Assistance	12.0%	1.3%
Manufacturing	0.9%	31.6%
Other Services (except Public Administration)	0.9%	1.1%
Professional, Scientific, and Technical Services	12.4%	26.3%
Wholesale Trade	0.0%	31.3%
All Other Industries	1.3%	6.4%
Grand Total	100.0%	100.0%

Key Results:

The Distribution Of Occupations Directly Supported By Science Funding

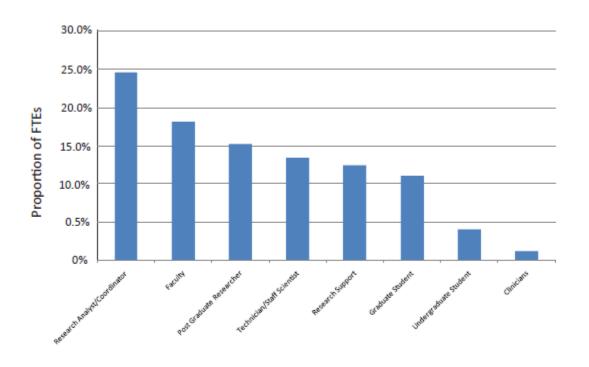


FIGURE 2: THE DISTRIBUTION OF OCCUPATIONS DIRECTLY SUPPORTED BY SCIENCE FUNDING (FTE JOBS)

Key Results:

The Number Of Distinct Individuals Per FTE Supported By Funding

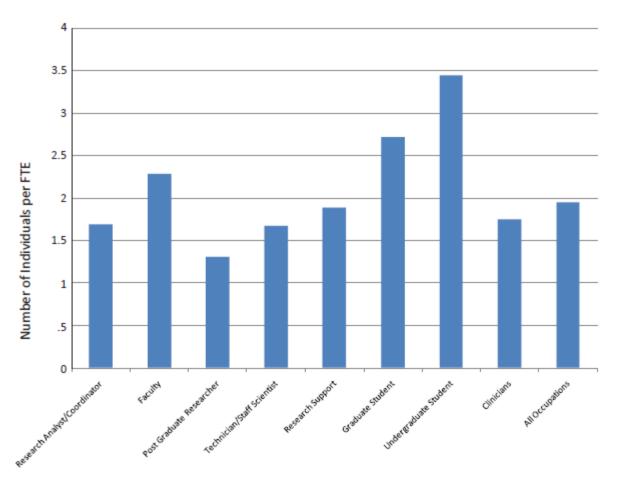


FIGURE 3: THE NUMBER OF DISTINCT INDIVIDUALS PER FTE SUPPORTED BY FUNDING

TABLE 2: DISTRIBUTION OF SUB-AWARD AND VENDOR JOBS BY INDUSTRY: FIRST QUARTER, 2011

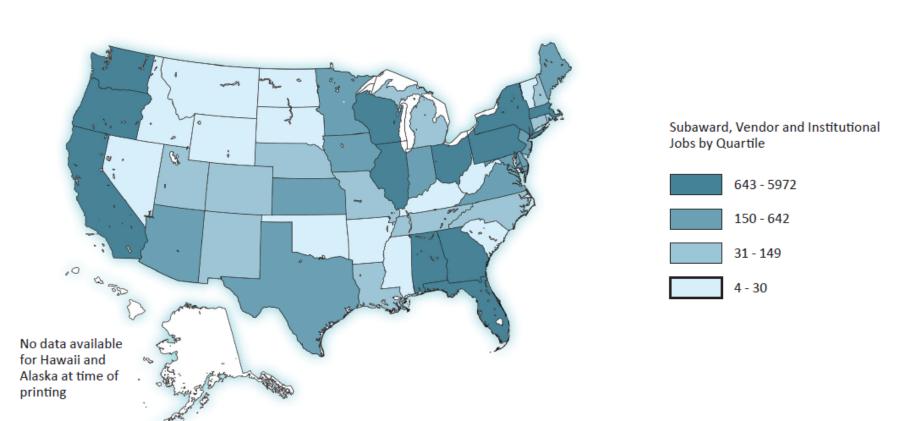
Industry	Sub-Awards	Vendors
Educational Services	72.2%	3.7%
Health Care and Social Assistance	8.7%	1.7%
Manufacturing	1.2%	33.9%
Other Services (except Public Administration)	1.1%	0.5%
Professional, Scientific, and Technical Services	15.2%	26.7%
Wholesale Trade	0.0%	27.6%
All Other Industries	1.6%	5.9%

100.0%

100.0%

Grand Total

The National Distribution of Science and Technology Related Jobs for Reporting Institutions



Who and What is Supported

First jobs report: who is supported (Level I)

- Second report (to come): what is supported (Level II)
 - Machine read awards to generate topics
- Match Level I with Level II ->
 - Match topics to awards and workforce data

What are students being trained in?

			Direct Pay	roll FTE Jobs	
Topic ID	Top Science Topics	Grad Student	Post-Grad Student	Undergrad	Grand Total
128	local education outreach	76.1	13.3	25.2	114.6
336	unique scientific advances future	66.5	33.8	11.6	112.0
194	public museum exhibit outreach	52.1	50.9	1.5	104.6
54	increase minority participation	22.6	50.1	20.8	93.5
223	, · · · ·	42.9	33.8	13.4	90.2
	summer undergrad lab participation				
365	partnership educational activities	41.4	36.9	6.7	85.0
26	chemistry dynamic molecules material properties organic	53.1	22.8	8.4	84.2
267	chemistry	47.7	19.9	12.4	80.0
334	machine intelligent system	24.8	33.7	20.1	78.6
352	biodiversity population conservation	10.7	59.5	4.7	75.0
21	young researcher mathematics conference	2.4	66.5	2.2	71.1
275	geoscience earth resources	7.8	62.5	0.5	70.7
80	urban area neighborhood public	14.5	47.9	8.1	70.4
132	limited approach problem	47.8	3.5	18.2	69.5
199	energy production biofuel product	46.4	13.0	9.8	69.3
38	software open source infrastructure	30.5	19.8	17.9	68.2
272	modeling system integrated framework	38.2	8.7	18.4	65.3
146	laboratory teaching courses	7.1	41.5	16.3	64.9
361	undergraduate teaching curriculum	16.2	44.0	3.7	63.9
277	species phylogeny relationship	23.1	19.7	20.1	62.8
374	effective community practices	27.6	13.9	21.2	62.7

What are students NOT being trained in?

			Direct Pa	yroll FTE Jobs	
Topic ID	Science Topics	Grad Student	Post- Grad Student	Undergrad	Grand Total
360	economic strategic game theory	3.8		1.0	4.8
196	planetary system observation	3.9	0.6	0.2	4.7
107	basic unit specific goal	1.3		3.2	4.5
262	animal/bird reproductive behavior	3.4	1.0		4.4
299	brain behavior hormone regulation	2.0	1.5	0.8	4.4
	Hispanic serving institution			4.1	4.1
373	economic policy financial market	3.0	0.1	1.0	4.1
400	isotope instrument facility	2.4	1.4		3.8
317	proposal funding request	1.1		2.7	3.8
119	k-12 partnership	2.6	0.6	0.5	3.7
74	gender labor market productivity	1.4		2.3	3.7
72	archaeological sites prehistoric	1.7	2.0		3.7
50	hydrothermal seafloor ridge	1.7	2.1	-0.3	3.5
206	insect behavior	2.7		0.8	3.5
186	radar storm structure	1.0		2.5	3.5
90	laboratory facilities renovation	1.1	1.4	0.9	3.4
65	RNA vaccine viral infection	3.4			3.4
245	early modern fossil evolution	1.7	1.0	0.6	3.3
85	ethnographic social interview	2.8	0.2	0.3	3.3
349	quantum theory algebra	2.8		0.5	3.3
396	volcanic magma eruption processes	1.5		1.8	3.3
261	institution collaboration proposal	3.2		0.0	3.3
207	GPS data measurement system	1.0	1.5	0.7	3.2
155	math activities girls youth	2.3		0.9	3.2
315	future challenges researchers	2.6	0.5	0.1	3.2

Level II: Approach

- A platform that can link inputs and outputs/outcomes using automated approaches
- Leverage existing data and knowledge (results of \$40 million in investments)
- Collaborative development of data infrastructure on broad categories of impact:

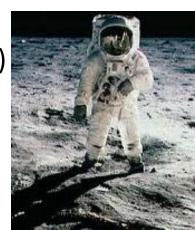
knowledge (e.g. publication, citations...)

economic (patents, spin off companies...)

workforce (employment, student mobility...)

social (e.g. health, environment, energy...)





The first set of suggested products

- Portfolio Characterization and Management
- Portfolio Reporting
- Fed Wide Profile and Visualizations

Key principles

- Build an open, transparent and automated system
- Facilitate the building of apps

Portfolio Characterization

- For agencies
 - Gap analysis: What is being funded in which areas?
 - Expertise Locator: Who is doing research in which topics?
- For Researchers
 - Funding information: What programs are funding research like mine?
 - Expertise Locator: Who else is doing research like mine?
- For VPs for Research and their Institutions
 - Gap analysis: Where are my institutional research strengths?
 - Expertise Locator: Where are

Portfolio Characterization





STAR METRICS Portfolio Explorer



Home

Portfolio Viewer

Expertise Locator

People Locator

Institutions

Welcome

NSF program managers have asked for tools to help them describe and assess their portfolios. This site provides three tools that help do this:

1. Portfolio Explorer



This tool describes the structure of divisional and program investments by topic. It has several views: proposals, awards, researchers and institutions. Managers can examine summary statistics for selected areas or drill down to the award-level by clicking the "detailed view" buttons. Data can be printed or exported for additional review and analysis - particularly to compare different investments over time.

2. Expertise Locator



This tool can be used to help find experts in particular topics. Search for PIs who have received awards in specific NIH) investments by institution and an earlier version of topic areas over time, as well as co-Pls. Future applicationstopics. It can be used to respond to requests on what will permit managers to search for reviewers based on the research has been funded in what areas, as well as to topics associated with incoming proposals.

3. Institutional Overview



This tool provides a geographic overview of NSF (and understand the geographic dimensions of investments.

The approach presented here makes extensive use of topic modeling (for more information see rd-dashboard.nitrd.gov/topic modeling.html). This approach provides a powerful and flexible framework for representing, summarizing and analyzing the contents of large document collections. As the tools develop, we will produce more intuitive summaries of the topics; in this beta version we simply provide the raw "bag of words" derived from using natural language processing on all NSF proposals received between 2007-2011.

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Deselect All (3)

STAR METRICS Portfolio Explorer



(more)

View	Divisions: CHE Proposals: Pending, Recommen	ded, Awarded	d	Options: Prima	ry; FY's 2005-201	0;	Ed
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Select	Topic	Division(s)	Awarded # / % of topic	Funding \$ (million)	Divisions/Topic	s 2/3	Analyz
A	Topic 211: synthesis reaction organic synthetic chiral chemistry_program compound organic_macromolecular molecules	CHE	43 / 2.29%	2.02	Top Division 2nd	CHE (3 topics) PHY (1 topic)	
	department_chemistry chemistry pharmaceutical asymmetric				Awarded	104	Analy
X	Topic 39: metal complexes ligand inorganic chemistry bond com- pound bioinorganic transition_metal organometallic_chemistry chemistry_program cluster reactivity iron ions	CHE	33 / 5.18N	1.03	Total Funding Date first Date last	\$37,063,450 04/5/2005 11/21/2010	
	Topic 26: molecular molecules spectroscopy dynamic molecule chemistry_program energy vibrational physical_chemistry single	BIO, CHE	32 / 3.28%	1.23	Top Topic (#) 2nd 3rd	211 (43 grants) 39 (33) 248 (28)	
	experimental electronic system excited processes Topic 397: NMR molecules magnetic_resonance chemistry	BIO, CHE,	31 / 3.00%	10.23	Top Topic (\$) 2nd 3rd	248 (\$34.01M) 211 (2.02) 39 (1.03)	
	nuclear_magnetic structure research_instrumentation NMR_spectrometer spectrometer acquire MHz department_chemistry	PHY			Institutions	75	Analy
	NMR_spectroscopy acquisition chemist				Total # of States	8	(teal)
X	Topic 248: theoretical computational molecular simulation calcula- tion theory dynamic quantum monte system carlo experimental density computational_chemistry properties	CHE, PHY	28 / 2.59N	34.01	Top Region 2nd 3rd 4th 5th	California (22 grar Arizona (14) Kentucky (8) Pennsylvania (8) New Jersey (4)	nts)
	Topic 362 analysis mass_spectrometry analytical mass_spectrometer mass instrument chromatography ion chemical	CHE, PHY	21 / 3.19%	0.76	Researchers	(more)	Analy
	separation liquid technique ionization chemistry gas				Top Researcher	Dr. Josepink (3	
	Topic 90: building laboratory facility clock upgrade circadian reno- vation facilities space lab system equipment laboratories existing	CHE	10 / 4.08%	4,56	2nd 3rd	Dr. Janice Voss (2 Ms. Jane Doe (2)	





t248

711

27

171

28 / 2.99%

34.01

STAR METRICS Portfolio Explorer



248 (\$34.01M)

211 (2.02) 39 (1.03)

Top Topic (\$)

2nd

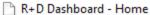
Home P	ortfolio	Viewer	Expertise Loc	ator	Institution	s Research	ners				
View	Division	s: CHE	Proposals: P	ending, R	Recommended	l, Awarded		Options: Prim	ary; FY's 2005-	2010;	Edit
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Portfolio Reporting R&D Dashboard

- For stakeholders
 - What research has been funded in my state/city?
 - Who are the researchers doing the research?
 - What are the results?
- For agencies/research institutions
 - Automated reporting of research portfolio
 - Automated documentation of institutional contribution
- For researchers
 - Minimal burden
 - Increased visibility to agencies, peers and stakeholders

Fed Wide Research Profile Building a better system

- Automate reporting => reduced agency costs
- Reduce science burden => scientists free to do science
- Better quality and structured data => reports can be used for analysis





Teadidata.nitrd.gov/beta/home.html



Tracking our progress. Leading the world in scientific and technological innovation.

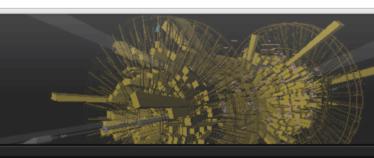
(F) Home

Investments

(Outputs

(About

♠ Contact



Highlights

Office of Science and Technology Policy of the White House - Orszag/Holdren memos to science agencies

Data Sources (and

Downloading Data and Tool Tips - making the most of this

Important Links

The R&D Dashboard

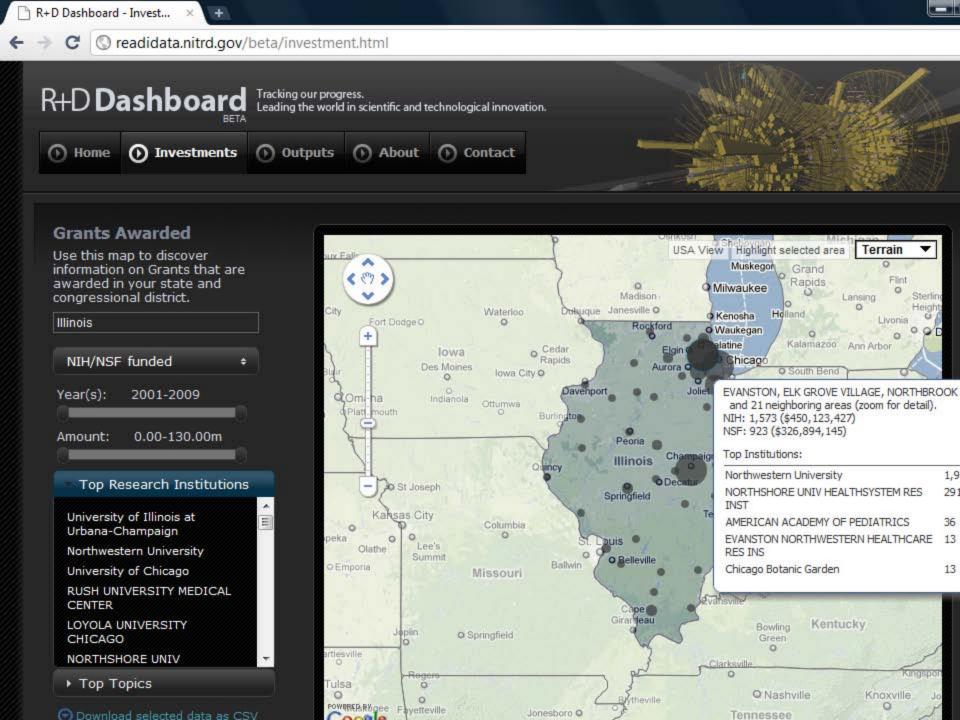
In response to the eGov Act of 2002 Section 207, the R&D Dashboard beta web site provides an initial look at U.S. Federal Investments in Science and Research from two key agencies; the National Institutes of Health (NIH) and the National Science Foundation (NSF) from years 2000-2009. The R&D Dashboard will expand in a future iteration to include ALL federal research and development spending and outputs data.

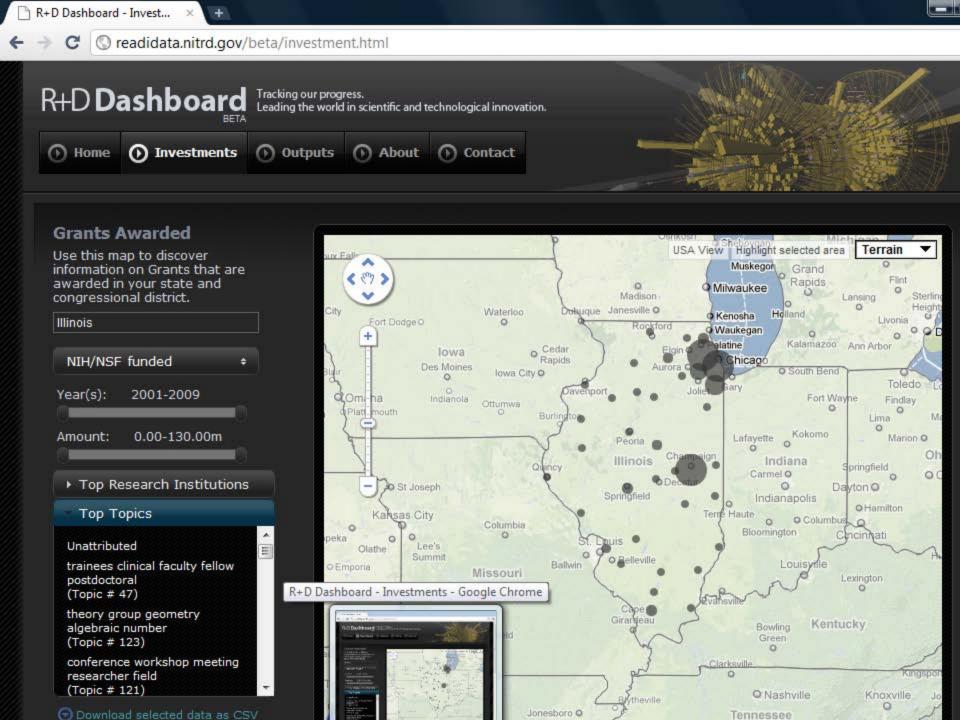
What's available

The information presented here is in the context of "investments", or grants issued by the Federal government to the receiving institutions, and "outputs", or the results of such investments in the form of publications and patent activity. Through comparing investment activities and institutions at a geographic, institutional and congressional district level, one is able to begin to trace the results of outcomes associated with the federal governments investments in science and technology. The aggregation of research topic themes allows viewers to see patterned activities of investment and outcome by technology or research areas also at a geographic level.

This is a Beta Site

The R&D Dashboard is a beta site and feedback is welcome. Please direct comments or questions to our contact page.











readidata.nitrd.gov/beta/investment.html

Grants Awarded

Use this map to discover information on Grants that are awarded in your state and congressional district.

Illinois

NIH/NSF funded

Year(s): 2001-2009

0.00-130.00m Amount:

▶ Top Research Institutions

Top Topics

Unattributed

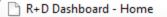
(Topic # 121)

trainees clinical faculty fellow postdoctoral (Topic # 47)

theory group geometry algebraic number (Topic # 123) conference workshop meeting researcher field

Download selected data as CSV

Show 1	00 entries			Search:		
Year ▼	Grant Number ≎	Federal Agency \$	Grant Amount ▼	Receiving Institution	;	
2009	1H75TP000325-01	NIH	\$41,610,324	ILLINOIS STATE DEPT OF PUBLIC HEALTH	í	
2009	0932251	NSF	\$30,207,358	University of Chicago	=	
2009	5U90TP516966-10	NIH	\$19,985,919	ILLINOIS STATE DEPT OF PUBLIC HEALTH	ľ	
2009	1H75TP000379-01	NIH	\$12,818,323	CHICAGO DEPARTMENT OF PUBLIC HEALTH		
2009	2U10CA031946-28	NIH	\$11,457,918	UNIVERSITY OF CHICAGO		
2009	5U90TP517008-10	NIH	\$10,699,574	CHICAGO DEPARTMENT OF PUBLIC HEALTH		
2009	5U54GM074942-05	NIH	\$10,544,058	UNIVERSITY OF CHICAGO		
2009	2U54AI057153-06	NIH	\$7,494,091	UNIVERSITY OF CHICAGO		
2009	0824618	NSF	\$6,800,512	National Opinion Research Center		
2009	0855569	NSF	\$5,912,000	University of Illinois at Urbana- Champaign		
2009	1RC2HL101651-01	NIH	\$5,646,401	UNIVERSITY OF CHICAGO		
2009	5U2GPS001285-02	NIH	\$5,553,717	AMERICAN SOCIETY FOR CLINICAL PATHOLOGY		
2009	5H23IP522565-07	NIH	\$5,378,772	CHICAGO DEPARTMENT OF PUBLIC HEALTH		
2009	5H23IP522568-07	NIH	\$5,238,180	ILLINOIS STATE DEPT OF PUBLIC HEALTH	,	
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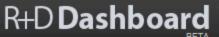








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Investments



Publications





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Downloading Data and Tool Tips - making the most of this

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Patents

Patent Applications

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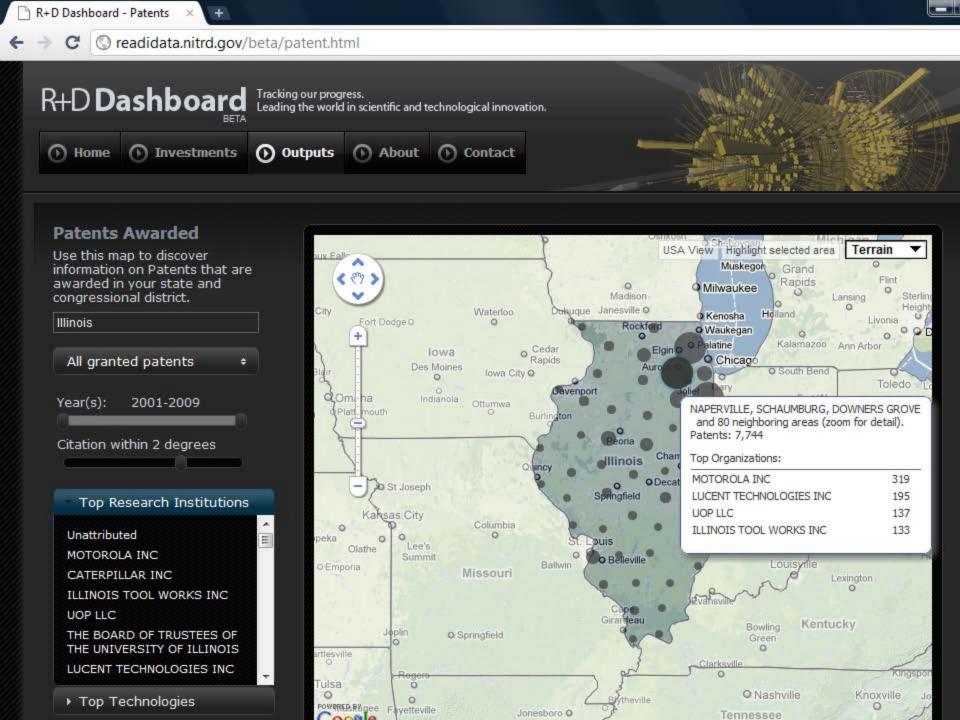
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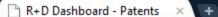
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readidata.nitrd.gov/beta/patent.html

Patents Awarded

Use this map to discover information on Patents that are awarded in your state and congressional district.

Illinois

All granted patents

Year(s): 2001-2009

Citation within 2 degrees

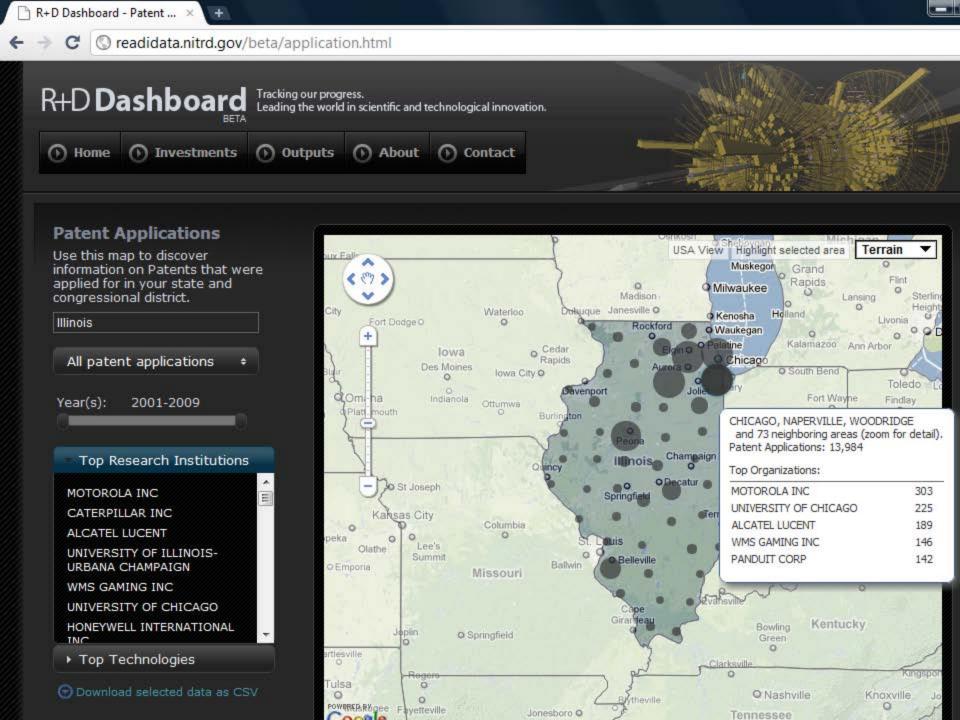
Top Research Institutions

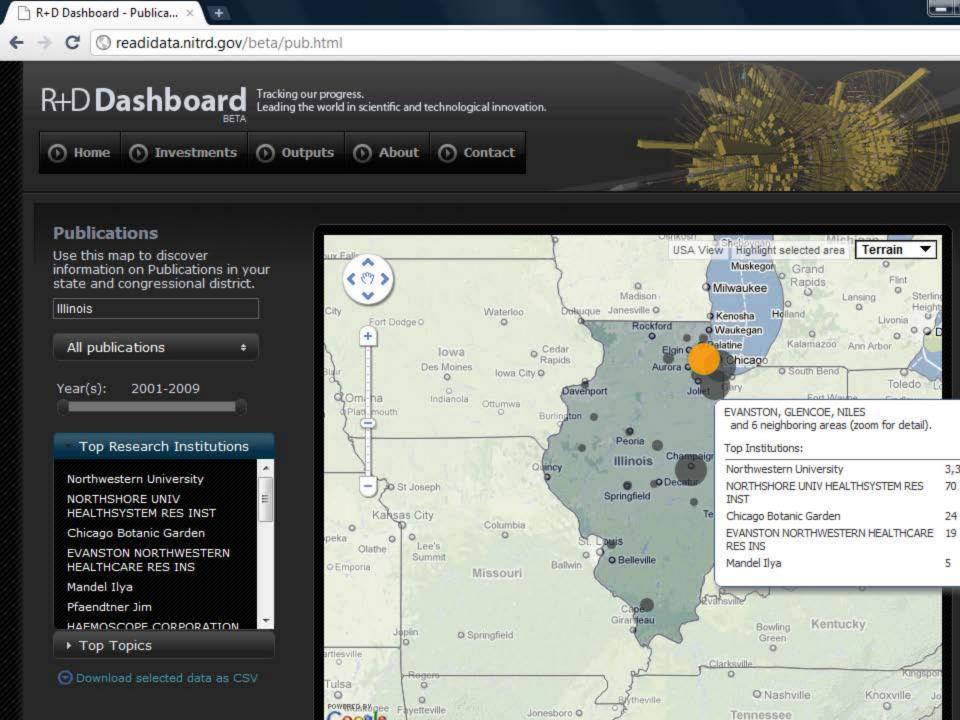
Unattributed MOTOROLA INC LUCENT TECHNOLOGIES INC UOP LLC ILLINOIS TOOL WORKS INC MOLEX INCORPORATED PANDUIT CORP CABOT MICROELECTRONICS

▶ Top Technologies

O Download selected data as CSV

Show 100 ▼	entries		Search:
Patent Number	Federal Agency	Institution/Company Name	Descr
D0606270		FREUDENBERG HOSEHOLD PRODUCTS LP	Mop housing
D0606398		MIDWEST PRINTING INCORPORATED	Graduated dispensing cap
D0604923		FREE GREEN CAN LLC	Refuse container
D0603322		USA WIRELESS SOLUTIONS	Windshield mounting assembly for h
D0605828		WM WRIGLEY JR COMPANY	Comestible
D0605329		FOCAL POINT LLC	Lighting fixture
D0603649		PRINCE CASTLE INC	Conveyor toaster
D0603781		CONTROL SOLUTIONS LLC	Mounting clip
D0606848		CONTROL SOLUTIONS LLC	Mounting clip
D0606849		CONTROL SOLUTIONS LLC	Mounting clip
D0599209		BONAKEMI USA INC	Liquid container
D0605907		WILTON INDUSTRIES INC	Handheld dual grater/zester
D0605232		KABUSHIKI KAISHA SEGA	Game device
D0601343		WILTON INDUSTRIES INC	Bag station
D0601663		VALMATIC VALVE MANUFACTURING CORP	Ball valve
•	111		Þ









Publications

Use this map to discover information on Publications in your state and congressional district.

Illinois

All publications

Year(s): 2001-2009

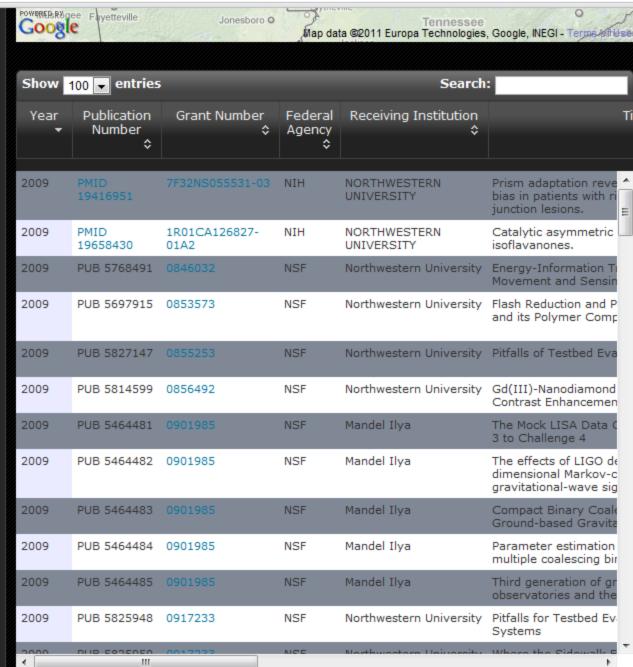
► Top Research Institutions

Top Topics

system computing power
design performance
(Topic # 200)
material properties nano
nanoparticles nanotechnology
(Topic # 64)
quantum magnetic physic
material spin
(Topic # 167)

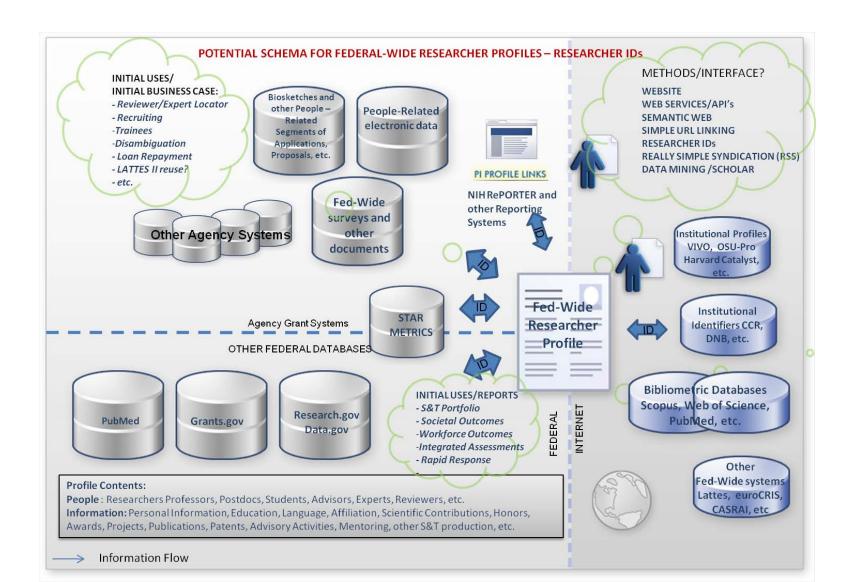
O Download selected data as CSV

chemistry reaction metal



Building a better system:

Fed Wide Researcher Profile



FRPS Next steps

- Federal Demonstration Partnership Pilot come to next presentation with Wally Schaffer
- Lattes http://www.slideshare.net/rpacheco/sti-national-information-system-platform-the-brazilian-case-of-lattes
- http://www.slideshare.net/rpacheco/stiinformation-systems-brazilian-initiativesfrequently-asked-questions
- ORCID grant

What can you do?

Help us expand by joining

 More institutions => greater coverage, greater leverage, greater impact

Provide input into implementation of Level II

 Followon workshops, demonstrations and grants for your researchers (through the SciSIP program at NSF)

Thank you!

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