Supporting International Research Networking

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Map of Scientific Collaborations from 2005-2009


Illuminated Diagram Display on display at the Smithsonian in DC. http://scimaps.org/exhibit_info/#ID
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

Interested to host the exhibit?
scimaps.org/contact
Overview

1. **Research Networking Services** that aim to support collaborations, research management, and the flow of knowledge/expertise.

2. **VIVO Approach and Visualizations** that help answer When, Where, What, With Whom questions.

3. **Outlook** how to scale and commoditize data mining and visualizations of research networking data.
Find your way
Information Technology
Terra bytes of data
Find collaborators, friends
Identify trends

LinkedIn: World's Largest Professional Network

https://www.linkedin.com
ResearchGate GmbH

https://www.researchgate.net

Launched in May 2008, has a user base of 2.3 million scientists worldwide in Aug. 2013

Academia.edu—Share Research

http://www.academia.edu

Launched in Nov 2010.
Networking Services—60 More

<table>
<thead>
<tr>
<th>Research Networking Tool</th>
<th>Link to Product Page</th>
<th>Developer/Owner</th>
<th>Open Source</th>
<th>Adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity Insight</td>
<td>Activity Insight</td>
<td>Digital Measures</td>
<td>No</td>
<td>USC Marshall School of Business</td>
</tr>
<tr>
<td>C-KNOW</td>
<td>C-KNOW</td>
<td>Science of Networks in Communities (SONIC) - Northwestern University</td>
<td>Yes</td>
<td>National Cancer Institute, National Science Foundation</td>
</tr>
<tr>
<td>Collaborative Partnership</td>
<td>Collaborative Partnership</td>
<td>University of Texas at Arlington</td>
<td>Yes</td>
<td>UT Arlington, UT Pan American, University of North Texas Health Science Center, UT El Paso, UT San Antonio, UT Tyler, UT Health Science Center, University of North Texas, UT Dallas, UT Health Center at Tyler, Texas Christian University, (plans to add Gulf Coast Consortium: Rice University, Baylor College of Medicine)</td>
</tr>
<tr>
<td>Community Academic Profiles</td>
<td>Community Academic Profiles</td>
<td>Stanford University</td>
<td>No</td>
<td>Stanford University</td>
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<tr>
<td>Curvita Profile Manager</td>
<td>Curvita Profile Manager</td>
<td>SolidMed Solutions</td>
<td>No</td>
<td>University of North Carolina</td>
</tr>
<tr>
<td>CUSP - Columbia University Scientific Profiles</td>
<td>CUSP</td>
<td>Columbia University</td>
<td>No</td>
<td>Columbia University</td>
</tr>
<tr>
<td>Digital Vita</td>
<td>Digital Vita</td>
<td>Center for Dental Informatics - University of Pittsburgh</td>
<td>Yes</td>
<td>University of Pittsburgh, Pitt Health Sciences Center</td>
</tr>
<tr>
<td>Elsevier’s SolVit Experts (formerly College’s Expert Profiling)</td>
<td>SolVit Experts</td>
<td>Elsevier</td>
<td>No</td>
<td>45+ implementations worldwide enabling profiles for researchers at 50+ institutions. Customers include Johns Hopkins University, Memorial Sloan-Kettering, Northwestern University, REACH NC, University of Michigan, University of Texas MD Anderson Cancer Center, and several institutions in Asia-Pacific, Europe and Latin America. See SolVit</td>
</tr>
</tbody>
</table>


Direct2Experts –Federated Network of Biomedical Research Expertise

http://direct2experts.org

A Federated Network of Biomedical Research Expertise
DIRECT-ly Supported by Researchers’ Institutions

A Network for All

The DIRECT2Experts network, open to all biomedical institutions, is a pilot project facilitated by the Research Networking Working Group of the NIH-supported Clinical & Translational Science Award (CTSA) Consortium.

Our Goal

To improve biomedical research and leverage our strengths as a community by creating a network that enables easy access to expertise and related resources across institutions regardless of local platforms and tools, and in collaboration with participating institutions to ensure access to approved and verified data.

What makes DIRECT2Experts different?

- Rather than searching public databases or asking individual researchers to “sign-up”, DIRECT2Experts works directly with institutions to connect to their existing research networking tools.
- DIRECT2Experts works across different software products and respects local privacy policies, enabling many institutions to participate.
- The focus of DIRECT2Experts is to bring more institutions and investigators into the fold, allowing for an assessment of the value provided and challenges of searching a national network.
Participants
The institutions currently participating in DIRECT2Experts are listed below. Note that institutions can participate in different ways, and not all have research networking tools connected to DIRECT2Experts yet.

1. Albert Einstein College of Medicine - SciVal Experts
2. Arizona State University - SciVal Experts
3. Baylor College of Medicine - Profiles RNS
4. Boston University - Profiles RNS
5. Case Western Reserve University - SciVal Experts
6. Cornell University - SciVal Experts
7. CTSI at Children's National - SciVal Experts
8. David Geffen School of Medicine at UCLA - UCLA CTSI
9. Georgia Regents University - SciVal Experts
10. Harvard University - Profiles RNS
11. Indiana CTSI - CTSI HUB
12. Indiana University School of Medicine - SciVal Experts
13. Instituto Politécnico Nacional - SciVal Experts
15. Kanazawa University - SciVal Experts
16. MD Anderson - SciVal Experts
17. MEHARRY Medical College - SciVal Experts
18. Memorial Sloan Kettering Cancer Center - SciVal Experts
20. Michigan State University - SciVal Experts
21. National Institute of Immunology (India) - SciVal Experts
22. Northwestern University - SciVal Experts
23. Northwestern University Feinberg School of Medicine - LatticeGrid
24. Ohio State University Health Sciences - SciVal Experts
25. Oregon Health & Science University - SciVal Experts
26. Pennsylvania State University - Profiles RNS
27. Ponce School of Medicine - VIVO
28. Qatar University - SciVal Experts
29. KTRN (18 RCMI institutions) - Profiles RNS
30. Shibaura Institute of Technology - SciVal Experts
31. South Carolina (HSSC/SCTR) - Profiles RNS
32. Stanford University School of Medicine - CAP
33. Temple University Center for Clinical & Transl. Science - SciVal Experts
34. The Scripps Research Institute - VIVO
35. The University of Alabama at Birmingham - SciVal Experts
36. UAE University - SciVal Experts
37. UC Davis Health System - SciVal Experts
38. Universidad Autonoma de Queretaro - SciVal Experts
39. Universidad de Santiago de Chile - SciVal Experts
40. Universitat Autonoma de Barcelona Campus of International Excellence - SciVal Experts
41. Universiti Kebangsaan Malaysia - SciVal Experts
42. University of California, San Francisco - Profiles RNS
43. University of Colorado Profiles - Profiles RNS
44. University of Connecticut Health Center - Profiles RNS
45. University of Florida - VIVO
46. University of Illinois at Chicago - SciVal Experts
47. University of Iowa - LNK
48. University of Maryland - SciVal Experts
49. University of Massachusetts - Profiles RNS
50. University of Miami - SciVal Experts
51. University of Michigan - SciVal Experts
52. University of Minnesota - Academic Health Center - Profiles RNS
53. University of Minnesota - Twin Cities Campus - SciVal Experts
54. University of Nebraska - SciVal Experts
55. University of Pittsburgh - Digital Vita
56. University of Porto - SciVal Experts
57. University of Rochester Medical Center - Profiles RNS
58. University of Southern California - Profiles RNS
59. University of Texas Health Science Center at Houston (UTHealth) - SciVal Experts
60. University of Washington - SciVal Experts
61. UT Health Northeast/UTHSC Tyler - SciVal Experts
62. UT Health Science Center - SciVal Experts
63. UT Medical Branch at Galveston - SciVal Experts
64. UT Southwestern Medical Center - SciVal Experts
65. Wake Forest Baptist Medical Center - Profiles RNS
66. Washington State University - SciVal Experts
67. Washington University in St. Louis - VIVO
68. Wayne State University - SciVal Experts
69. Weill Cornell Medical College - VIVO

CTSAConnect—A Linked Open Data approach to represent clinical and research expertise, activities, and resources

http://www.ctsacconnect.org
CTSASearch

http://research.icts.uiowa.edu/polyglot/ctsaSearch.jsp

118,000 profiles from 14 institutions – VIVO, Profiles, SciVal Experts, and Loki, plus custom harvests.
VIVO Updates

http://vivoweb.org

- Align with **international standards**: Significant partners include [CASRAI](http://www.casrai.org) (Consortium Advancing Standards in Research Administration Information), [EuroCRIS](http://www.eurocris.org) (Current Research Information Systems) and the [ORCID](http://orcid.org) (Open Researcher and Contributor ID) Initiative.

- **Adopters** of the VIVO platform include: the U.S. Department of Agriculture, the U.S. Environmental Protection Agency, the American Psychological Association and the Publish Trust Project, the Australian-based ANDS VIVO project, and a growing number of universities around the world. Producers of VIVO-compliant data also include: Clinical and Translational Science Award (CTSA) Consortium institutions, Harvard Profiles, Elements from Symplectic Limited, and Elsevier’s SciVal Experts.

- Cornell pulls data from **Activity Insight**, a widely-adopted faculty reporting system from Digital Measures, and code can be shared.

*Thanks go to Jon Corson-Rikert, Cornell University.*

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**Harvard Profiles**

http://profiles.catalyst.harvard.edu/

- UCSF released an update of Profiles RNS that includes **OpenSocial** support—the same front-end gadgets can now run on VIVO or Profiles RNS.

- **Scopus** data can be purchased through Elsevier’s SciVal Author Profile Refinement Services and loaded into Profiles RNS.

- Boston University has developed a tool to **create ORCID IDs for their faculty** and synch publication data between ORCID and Profiles RNS. They plan to release it as open source code soon.

- Profiles RNS sites are part of Direct2Experts, CTSAConnect, and VIVOSearch.

*Thanks go to Griffin Weber, Harvard University.*
SciVal Experts by Elsevier

http://www.elsevier.com/elsevier-products/scival

• Supports **group profiles** (e.g., schools, divisions, departments OR institutes, centers, and programs OR graduate programs) but also multi-institutional instances [e.g., Solar Fuels Institute (SOFI) and Chicago Collaboration for Women in STEM sites].

• Experts can pull data from some **annual reporting/faculty information systems**, such as FASIS at Northwestern.

• **De-duplication** feature allows for the reconciliation of multiple versions of, say publication data, ingested from multiple data sources (e.g., WoS, Scopus, CrossRef, and PubMed).

• Supports **reporting**, e.g., multiple biosketch and CV templates.

• Committed to interoperability, e.g., with SciENcv.

• **ORCID IDs** are incorporated into the Scopus DB in support of author and institution refinement.

Thanks go to Holly J Falk-Krzesinski, Vice President Global Academic & Research Relations, Elsevier

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Federal-Wide Researcher Profile Project

http://rbm.nih.gov/profile_project.htm
Expert Networking Services

Desirable Properties

- Open data
- Open code
- Easy harvesting and ingest of major publication datasets, e.g., MEDLINE, Elsevier, Reuters, SciELO, others.
- Inter-platform compatibility—VIVO, Profiles, SciVal Experts, Loki, etc.
- Part of federated search tools, Direct2Experts, CTSAconnect, and SciVal Community, etc.
- Supports/uses DOIs, author identifiers, e.g., ORCID
- Sustainable
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2. **VIVO Approach and Visualizations** that help answer When, Where, What, With Whom questions.

3. **Outlook** how to scale and commoditize data mining and visualizations of research networking data.
**Type of Analysis vs. Level of Analysis**

<table>
<thead>
<tr>
<th></th>
<th>Micro/Individual (1-100 records)</th>
<th>Meso/Local (101–10,000 records)</th>
<th>Macro/Global (10,000 &lt; records)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Statistical Analysis/Profiling</strong></td>
<td>Individual person and their expertise profiles</td>
<td>Larger labs, centers, universities, research domains, or states</td>
<td>All of NSF, all of USA, all of science.</td>
</tr>
<tr>
<td><strong>Temporal Analysis (When)</strong></td>
<td>Funding portfolio of one individual</td>
<td>Mapping topic bursts in 20-years of PNAS</td>
<td>113 Years of physics Research</td>
</tr>
<tr>
<td><strong>Geospatial Analysis (Where)</strong></td>
<td>Career trajectory of one individual</td>
<td>Mapping a state’s intellectual landscape</td>
<td>PNAS publications</td>
</tr>
<tr>
<td><strong>Topical Analysis (What)</strong></td>
<td>Base knowledge from which one grant draws.</td>
<td>Knowledge flows in Chemistry research</td>
<td>VxOrd/Topic maps of NIH funding</td>
</tr>
<tr>
<td><strong>Network Analysis (With Whom?)</strong></td>
<td>NSF Co-PI network of one individual</td>
<td>Co-author network</td>
<td>NSF’s core competency</td>
</tr>
</tbody>
</table>
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 Mistlehauer, Anup Savant, Christopher Westling, Rebecca Younes. **University of Florida**: Mike Conlon (VIVO and UF PI), Cecilia Botero, Erin Brooks, Amy Bushler, Ellie Bushhouzen, Chris Case, Valrie Davis, Nita Ferree, Chris Haines, Rae Jesano, Margeaux Johnson, Sara Kreinent, Yang Li, Paula Markes, Sara Russell Gonzalez, Alexander Rockwell, Nancy Schaefer, Michele R. Tennant, George Hack, Chris Barnes, Narayan Raun, Brenda Stevens, Alicia Turner, Stephen Williams. **Indiana University**: Katy Borner (IU PI), William Barnett, Shanshan Chen, Ying Ding, Russell Duhon, Jon Dunn, Micah Linsemeier, Nianli Ma, Robert McDonald, Barbara Ann O'Leary, Mark Price, Yupin 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, Michaelleen 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 Klar, Peter Michelini, Grace Migliorati, John Ruffing, Jason Specland, Tru Tran, Jesse Turner, Vinay Varughese.
**Temporal Analysis (When)** Temporal visualizations of the number of papers/funding awarded 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)
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**Network Analysis (With Whom?)** Who is co-authoring, co-investigating, co-inventing with whom? What teams are most productive in what projects?
Overview, Interactivity, Details on Demand come to commonly used devices and environments.
Download Data

General Statistics
• 36 publication(s) from 2001 to 2010 (.CSV File)
• 80 co-author(s) from 2001 to 2010 (.CSV File)

Co-Author Network
(GraphML File)

Save as Image (.PNG file)

Tables
• Publications per year (.CSV File)
• Co-authors (.CSV File)

http://vivo.iu.edu/vis/author-network/person25557

2008 collaboration patterns for medical institutions located close to Melbourne University
Source: Web of Science co authorship information. Compiled by Simon Porter
Co-authorship network for the department of Information Systems
Source: Melbourne Research Windows. Contact Simon Porter simon.porter@unimelb.edu.au

Bimodal network of search terms and researchers extracted from research profile search results to show the University’s capability in Disaster Management to the Government
Contact: simon.porter@unimelb.edu.au
Top MeSH Disease Concepts Appearing in PubMed Publications by the University of Michigan Medical School. Links connect concepts where 100+ authors published about both concepts within the span of their careers.

Contact: Jeffrey Horon, J.Horon@elsevier.com

This visualization revealed that animal disease models were central to disease research at U-M which encouraged additional thought and attention to animal husbandry, animal expenses, and core/shared services overall.

Contact: Jeffrey Horon, J.Horon@elsevier.com
**P30 Member Collaborations – Sponsored Project Co-Participation and Co-Authorship Network.** Used in successful P30 funding application. Shows the PI's relationships with various P30 members, conveying that the PI was not only the formal center of the group but also the informal center and the person who exhibited the highest betweenness centrality. Contact: Jeffrey Horon, J.Horon@elsevier.com

**Inter-Institutional Collaboration Explorer**
This visualization shows information about “collaborative publications” found at 2 or more Researcher Networking websites. The idea that institutions don’t work together and that biomedical research is conducted in silos is not true. Researchers, even when separated by great distances, are in fact willing to work together, and this visualization demonstrates that they often do. Contact: Nick Benik (nbenik@gmail.com), Harvard Medical School, Boston, MA. URL: http://xcite.hackerceo.org/VIVOviz
Inter-Institutional Collaboration Explorer
The outer solid colored arcs represent the 11 institutions. The size of the arc is proportional to the number of collaborative publications found on the site. The inner colored bands represent the number of collaborative publications found between the two institutions that each band connects. Clicking an institution's arc will hide any bands not connected to that institution and will display a timeline of when that institution’s collaborative publications were written.

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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.
Design and Update of a Classification System:
The UCSD Map of Science

Nov. 04-05, 2013 Science Mapping Standards Workshop at Indiana University will bring together leading researchers and data providers to

- Update UCSD science map—adding recent publication data by Scopus and Web of Science as well as Chinese data and data from SciELO.
- Discuss scientifically sound standards for aligning existing science maps to each other and to major classification systems.

References


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