

OPENING UP SCIENCE WITH VIVO

Kristi L. Holmes, PhD

@kristiholmes

@vivocollab



Let's talk about the data...

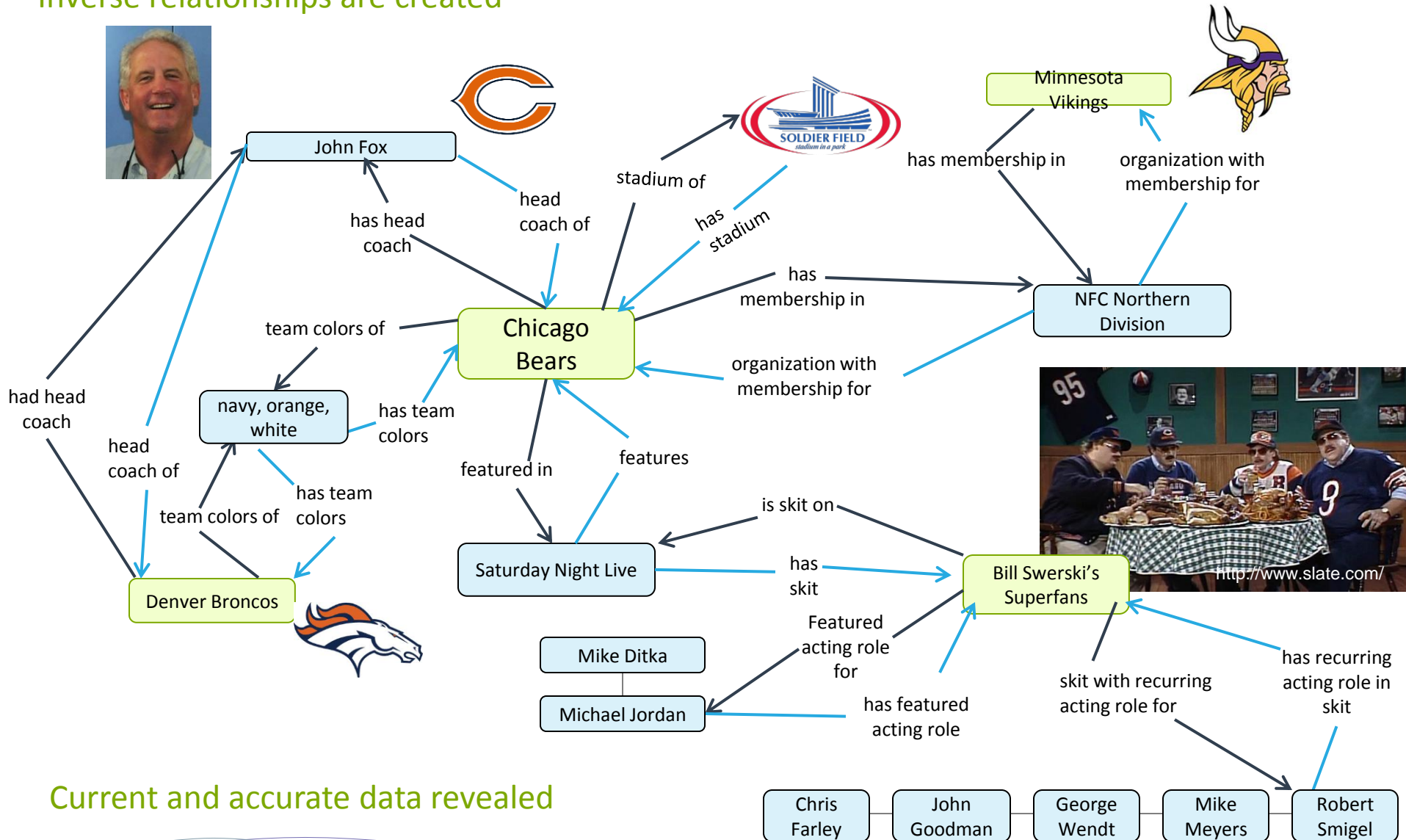
The Semantic Web isn't just about putting data on the web. It is about making links, so that a person or machine can explore the web of data. With linked data, when you have some of it, you can find other related data.



Detailed Data Relationships

Inverse relationships are created

Connections among concepts illustrated



Let's think about why this is important on the institutional level...



Current challenges

Faculty

- *Research is increasingly more interdisciplinary*
 - How can you find collaborators, track competitors, and stay abreast of current research inside large institutions, at other institutions, and globally?
 - How can you find others with shared interests or expertise?
 - How can you build diverse teams? Find mentors? Be identified as a partner by community groups?

Support: facilities and personnel

- Library administration or directors of core facilities want to align their strategic plan with the evolving research needs of their clientele.
- Identifying growth areas of research through increasing publications, focused areas of research and grant dollars enables this task to become more evidence-based.

Administrators

- *Research institutions can be extremely large and diverse*
 - How can administrators showcase and monitor research activity, track competitors, and stay abreast of current research inside large institutions, at other institutions, and globally?
 - How can you enhance visibility and present a unified picture of an institution?

Research Networking

Information about scholars is optimized using a Web-based infrastructure of standards and technologies which allows for a distributable, machine readable description of data that allows for stronger data and smart web application linkages across many universities, agencies, societies both within the US and abroad.

Why is this important?

Linked data infrastructure allows for

- Visualizations, research and clinical data integration, and deep semantic searching across multiple types and sources of data
- By breaking data out of traditional database silos, research networking platforms promote a network effect within a single site and across multiple sites
 - The value of the network increases with the amount of linked data and applications that are available to consume the linked data.

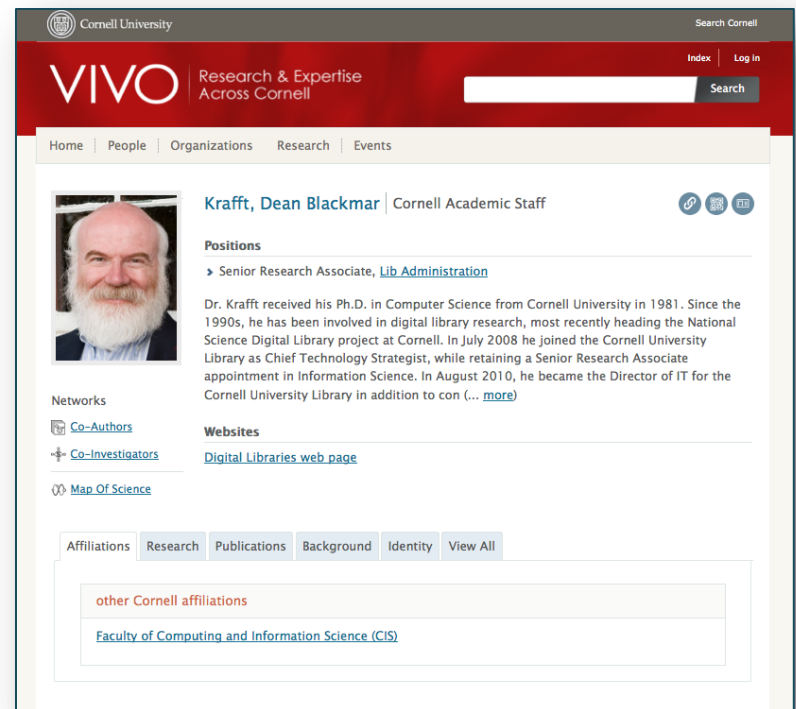


What is VIVO?

1. An open source semantic web application
2. An information model
3. An open community

VIVO

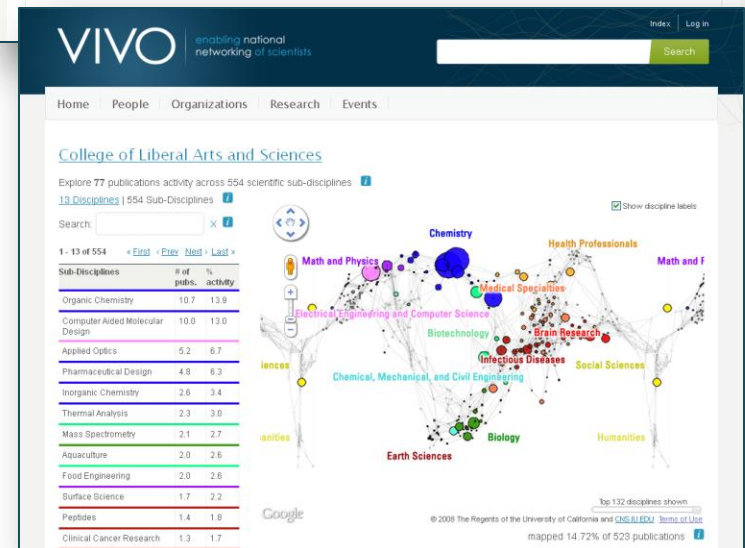
connect • share • discover



What is VIVO?

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The screenshot shows the VIVO profile page for Dean Blackmar. The header includes the Cornell University logo and the VIVO logo with the tagline "Research & Expertise Across Cornell". Navigation links for Home, People, Organizations, Research, and Events are present. The profile section features a photo of Dean Blackmar, his name, and affiliation with Cornell Academic Staff. It lists his positions, including Senior Research Associate and Lib Administration, and provides a brief biography. Below the biography, there are links for Networks (Co-Authors, Co-Investigators, Map Of Science) and Websites (Digital Libraries web page). At the bottom, there are tabs for Affiliations, Research, Publications, Background, Identity, and View All. The Affiliations tab is selected, showing "other Cornell affiliations" and "Faculty of Computing and Information Science (CIS)".



VIVO

An open-source semantic web application that enables the discovery of research and scholarship across disciplines in an institution.

VIVO harvests data from verified sources and offers detailed profiles of faculty and researchers.

Public, structured linked data about investigators interests, activities and accomplishments, and tools to use that data to advance science.

VIVO enjoys a robust open community space to support implementation, adoption, & development efforts around the world.

See <http://wiki.duraspace.org/display/VIVO>



<http://vivoweb.org>



<http://twitter.com/VIVOcollab>



<http://www.facebook.com/VIVOcollaboration>

VIVO enabling national networking of scientists

Home People Organizations Research Events Index Help

Conlon, Michael | Associate Director and Chief Operating Officer

Positions

- Biomedical Informatics, Director 2010 -
- Clinical and Translational Science Institute, Faculty 2010 -
- Clinical and Translational Science Institute, Associate Director and Chief Operating Officer 2010 -
- Health Outcomes Policy, Faculty 2008 -
- Health Outcomes Policy, Research Associate Professor 1992 -
- Health Outcomes Policy, Interim Division Chief, Biomedical Informatics 2009 - 2010
- Clinical and Translational Science Institute, Associate Director 2009 - 2010
- Information Technology, Associate CIO, IT Architecture 2008 - 2010
- Information Technology, Director of Data Infrastructure 2002 - 2010
- MarCon Global Data Solutions, Chief Technical Officer 1997 - 2002
- University of Florida Academic Health Center, Chief Information Officer 1997 - 2002
- College of Liberal Arts and Sciences, Director, Information Resources and Technological Programs 1993 - 1997
- Statistics (CLAS), Research Assistant Professor 1983 - 1992
- Center for Instructional Research and Computing Activities, Assistant Director, Academic Computing 1982 - 1983
- Center for Instructional Research and Computing Activities, Director, Statistical Consulting Center 1980 - 1983

Dr. Conlon is Associate Director and Chief Operating Officer of the University of Florida Clinical and Translational Science Institute, Director of Biomedical Informatics, UF College of Medicine, and Principal Investigator of the NIH project "VIVO: Enabling National Networking of Scientists." His responsibilities include development of academic biomedical informatics, expansion and integration of research and clinical information resources and strategic planning for academic health and un (... [more](#))

Publications in VIVO
36 in the last 10 full years (141 total)

[Co-Author Network](#)
[Map Of Science](#)
[Co-Investigator Network](#)



A VIVO profile allows you to:

The screenshot displays a VIVO profile for Michael Conlon. The header includes the VIVO logo and navigation links. The profile section shows a photo, name, and title: "Conlon, Michael | Associate Director and Chief Operating Officer". Below this, a "Positions" section lists various roles and dates, such as "Biomedical Informatics, Director 2010 -" and "Clinical and Translational Science Institute, Faculty 2010 -". A "Research Areas" section lists topics like "Biomedical Informatics", "Clinical Research Informatics", and "Electronic Data Capture". The "Affiliation" section shows "preferred title" as "Associate Director and Chief Operating Officer". The "member of" section lists various committees and organizations, including "Research Computing Advisory Committee Member 2011 -" and "CTSI Executive Operations Committee Member 2010 -".

Discover potential colleagues or campus resources by work area, authorship, & collaborations.

Showcase credentials, expertise, skills, and professional achievements for individuals and campus groups.

Connect within focus areas and geographic expertise.

Simplify reporting tasks and link data to external applications – e.g., to generate biosketches or CV or for reporting purposes.

Publish the URL or link the profile to other applications.

Display visualizations of expertise areas or complex collaboration networks and relationships.

University of Florida *i*

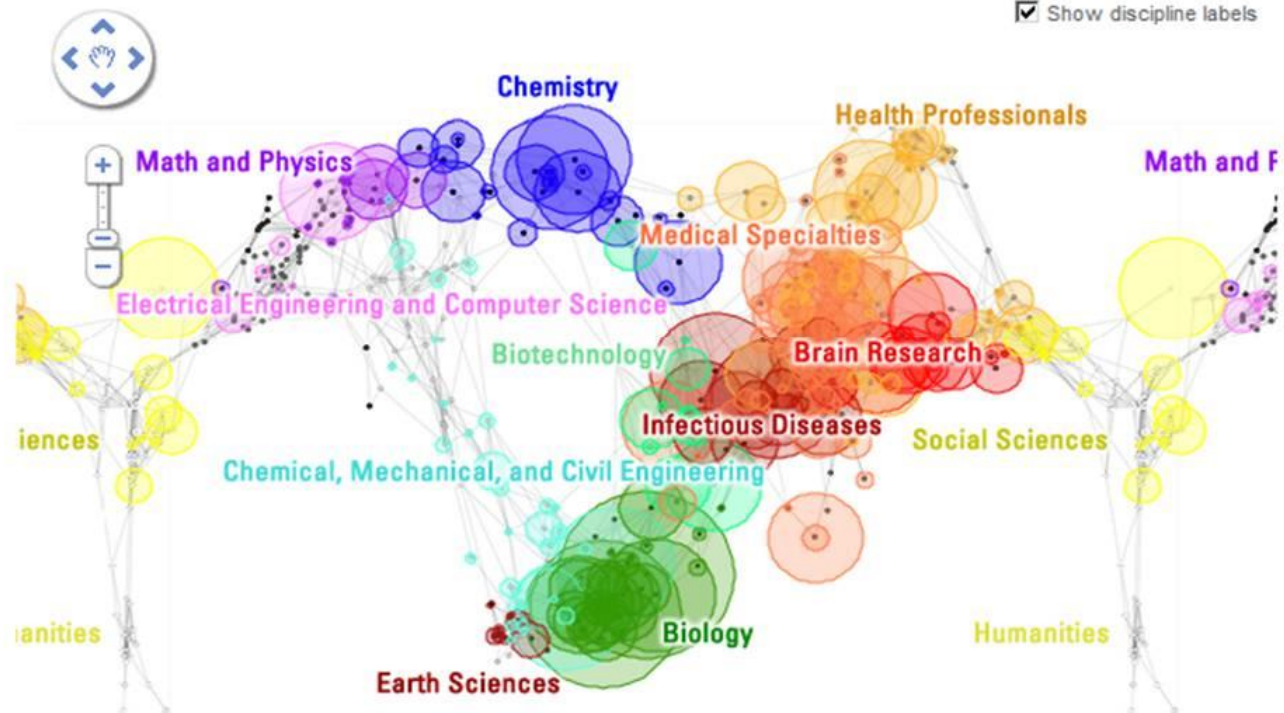
Explore **487** publications activity across 554 scientific sub-disciplines *i*

[13 Disciplines](#) | 554 Sub-Disciplines *i*

Search: X

1 - 13 of 554 « [First](#) [Prev](#) [Next](#) [Last](#) »

Sub-Disciplines	# of pubs.	% activity
Pest Management Science	24.2	5.0
Wildlife Research	19.1	3.9
Protein Science	13.1	2.7
Clinical Cancer Research	12.6	2.6
Brain Research	12.0	2.5



Google

Top 290 disciplines shown

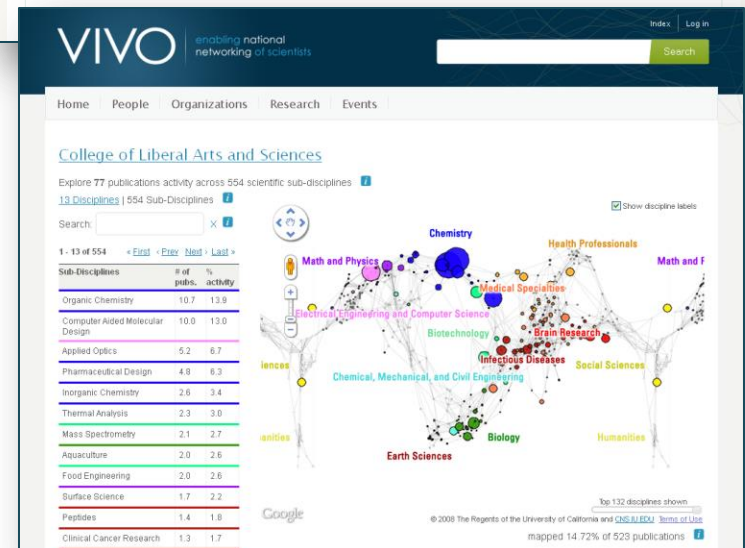
[Terms of Use](#)

mapped 14.55% of 3,346 publications *i*

What is VIVO?

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3. An open community

This screenshot shows a VIVO profile for Dean Blackmar, a Senior Research Associate in the Cornell Academic Staff. The page includes a header with the Cornell University logo and VIVO branding, a search bar, and navigation links. The profile features a photo of Dean Blackmar, his name, and his position. Below this, there are sections for 'Positions' (Senior Research Associate, Lib Administration), 'Websites' (Digital Libraries web page), and 'Networks' (Co-Authors, Co-Investigators, Map Of Science). A tabbed interface at the bottom allows viewing different aspects of his profile: Affiliations, Research, Publications, Background, Identity, and View All. The 'Affiliations' tab is currently selected, showing 'other Cornell affiliations' and 'Faculty of Computing and Information Science (CIS)'.




CTSA: Recommendations and Best Practices for Research Networking

The Research Networking Recommendations were approved by the CTSA Consortium Executive and Steering Committee on October 25, 2011.

Recommendations for Research Networking:

- **Recommendation:** All CTSA's should encourage their institution(s) to implement research networking tool(s) institution-wide that utilize **RDF triples** and an **ontology** compatible with the **VIVO ontology**.
- **Recommendation:** Information in people profiles at institutions should be publicly available as data as a general principle, specifically as **Linked Open Data**. To ensure quality of information, **authoritative electronic data sources versus manual entry** should be emphasized. Institutions will vary in the amount of information that they will include and make publicly available but the value is enhanced by the quality and quantity of information.
- **Recommendation:** Monitoring of the research networking landscape, technology, and tools should continue to be overseen by experts from the CTSA consortium (e.g., the **Research Networking group** of the **Informatics KFC**).

Building a large web of data, greater than any one effort



Data Creators, Data
Aggregators, & Data
Consumers

Repositories. Tools.
Applications. Workflows

A couple of local examples...



Brown University

- PLATFORM: VIVO
- DATA: Faculty CVs in Word or PDF converted to structured data by bibliographic services vendor
 - Data structures mapped to VIVO ontologies
 - Data converted to RDF and ingested into VIVO
 - Sparql queries create RDF graphs (relationships)



Brown University

https://vivo.brown.edu



Search



Manage your profile

Researchers@BROWN

Search

Home People Organizations Help

Welcome to Researchers@Brown

Researchers@Brown brings together, in one site, publicly available information on the people, departments, and activities that collectively make up research and scholarship in all disciplines at Brown University.

The Spring 2014 initial release of Researchers@Brown contains data from institutional sources and verbatim content from faculty profiles in the Directory of Research and Researchers at Brown (DRRB), a precursor system. Faculty members who do not have a profile can request one by contacting the appropriate [faculty affairs office](#).

A new "[Publications](#)" section is now available. Features include:

- Publications harvested from PubMed every Sunday night
- Enter DOI or PMID to have full citation automatically retrieved
- Become part of weekly harvest by entering a few PMIDs
- Links to full text when available
- Future harvesting from other sources (Web of Science, etc.)

A new "Geographic Research Area" section, using a standard set of

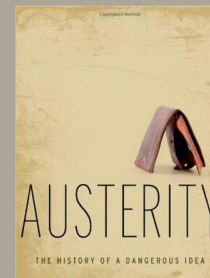
BROWN RESEARCH IN THE NEWS

»Progress on detecting glucose levels in saliva

»Cells to Silicon: Your Brain in 2050

»Epidemiology in South Africa: STI testing could boost HIV prevention
» [View More](#)

RECENT FACULTY BOOKS



Weill Cornell Medical College

- PLATFORM: VIVO
- DATA: a variety of sources, applied and leveraged in various ways...

Weill Cornell Medical College

VIVO
connect • share • discover



Weill Cornell Medical College

Index | Log in

Search

[Home](#) | [People](#) | [Organizations](#) | [Research](#) | [Support](#)

Welcome to the VIVO for Weill Cornell Medical College and the CTSC

VIVO is a research-focused discovery tool that enables collaboration among scientists across all disciplines. VIVO contains information about researchers associated with the **Clinical and Translational Science Center**.



Browse or search for people, departments, courses, grants, and publications.

People (6,534)

Activities (7)

Events (69)

Organizations (3,368)

Research (74,537)

Locations (324)

Adjunct Faculty

Affiliated Faculty

Courtesy Faculty

Faculty Member

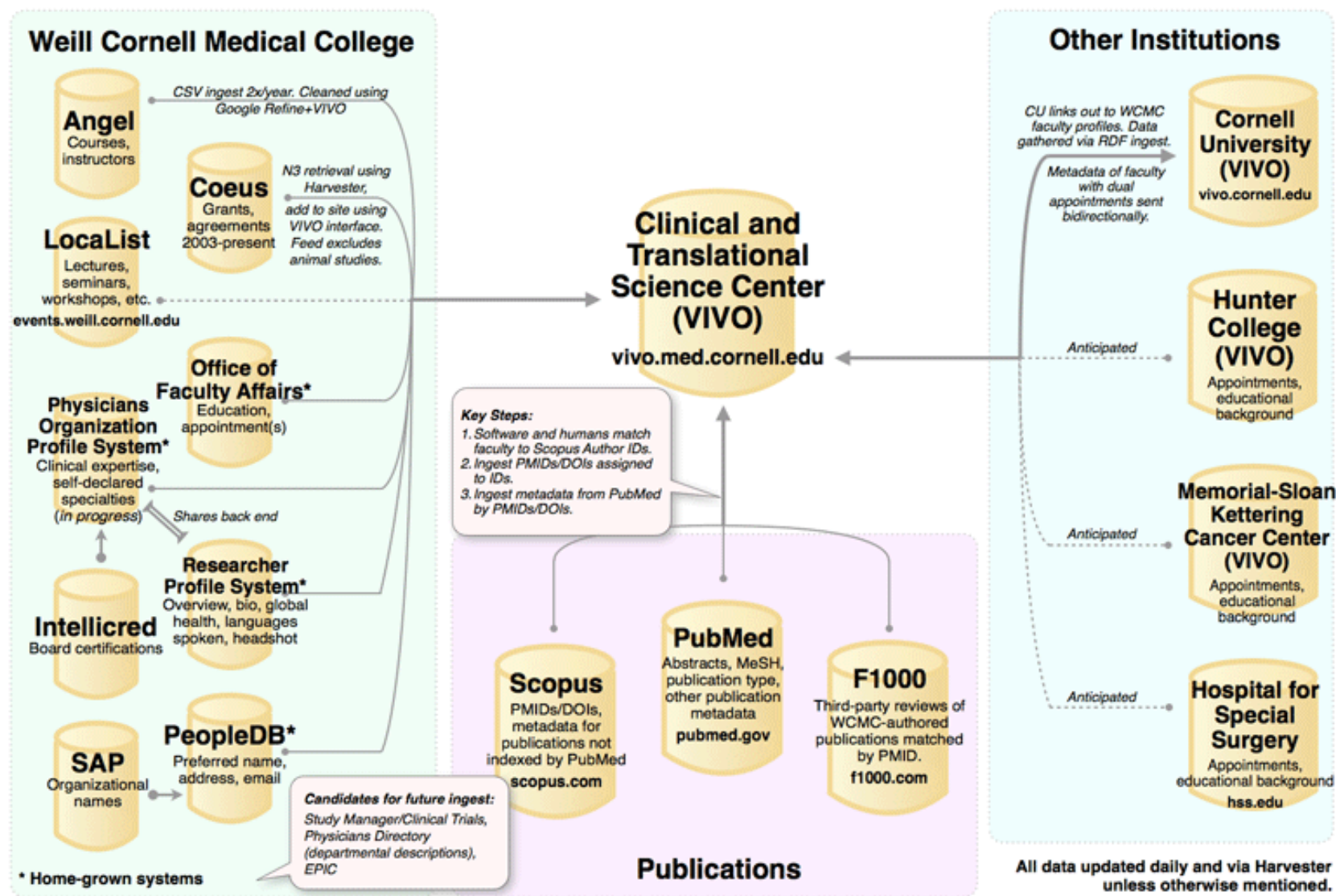
Faculty Member Emeritus

Full-Time WCMC Faculty

Instructor

Lecturer

WCMC CTSC's VIVO data sources



VIVO Dashboard

A Drupal-based tool for visualizing semantic data

Publications

Post-M.D. Appointments

Request Analysis

All

Most Cited

By Person

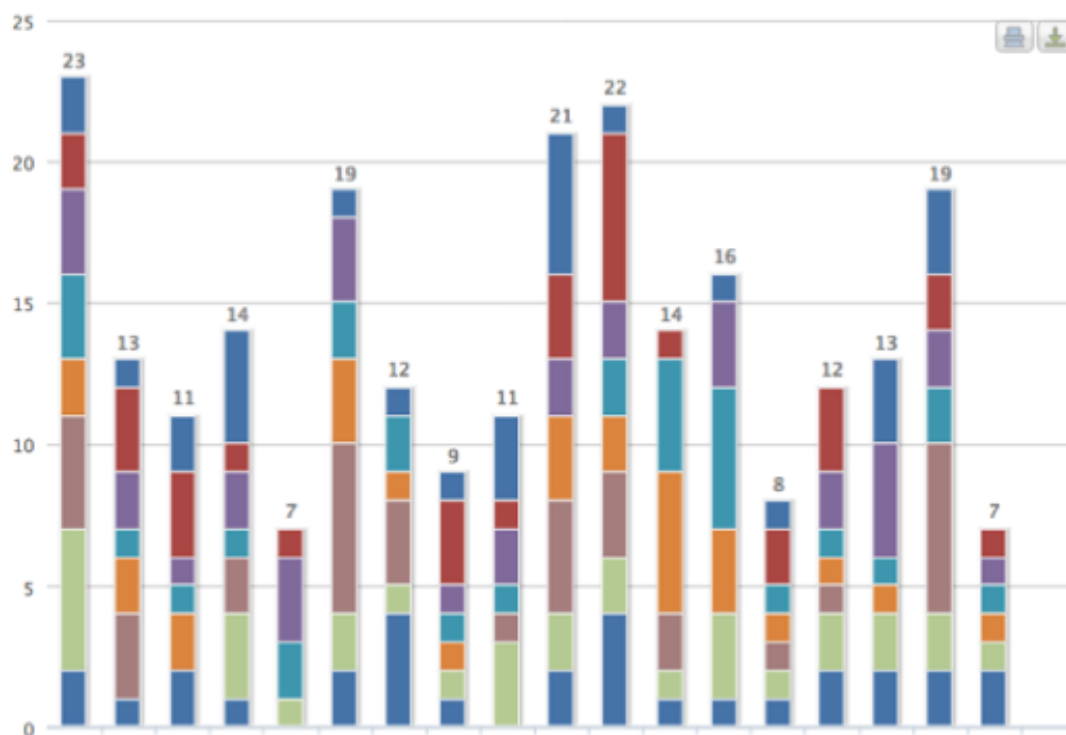
By Organization

PubMed Central Deposits

Publications

Graph

List



VIVO Dashboard

On demand publication
reporting and more

Read more: goo.gl/snG20

Filter Results

Year

1995 - 2013

☐ By Month

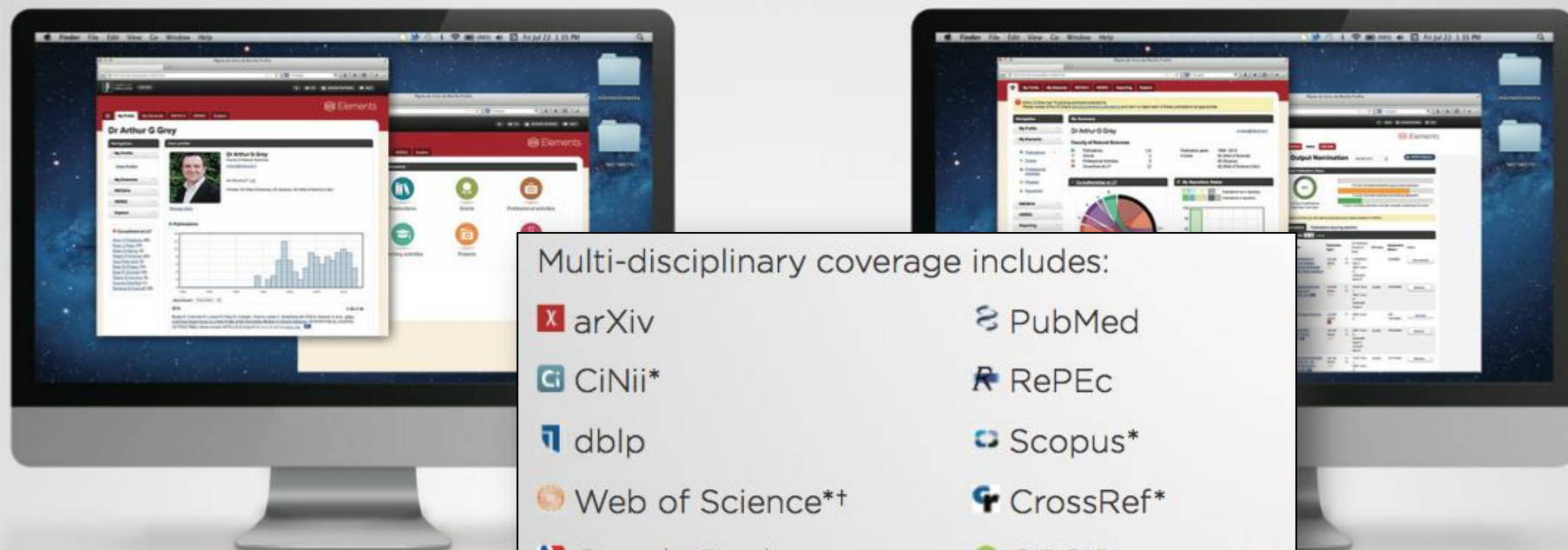
Journal

Publication Type













- ☐ Article
- ☐ Clinical Guideline
- ☐ Comment
- ☐ Conference Paper
- ☐ Editorial Article
- ☐ In Process
- ☐ Letter
- ☐ Report
- ☐ Research Article
- ☐ Review

Organization

Developers: Don Carpenter, Zeheng Wang



Multi-disciplinary coverage includes:

- | | |
|--|--|
|  arXiv |  PubMed |
|  CiNii* |  RePEc |
|  dblp |  Scopus* |
|  Web of Science*† |  CrossRef* |
|  Google Books |  ORCID |
|  Altmetric |  figshare |

*Subject to subscriptions †Lite and Premium web services

<http://vivosearch.org/>
<http://vivosearchlight.org/>
<http://vivo.cns.iu.edu/gallery.html>

Principal Investigator/Program Director (Last, First, Middle)

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. DO NOT EXCEED FOUR PAGE 8.

NAME Michael Conlon		POSITION TITLE Interim Director of Biomedical Informatics, University of Florida	
ERA COMMONS USER NAME MCONLON		EDUCATION (Begin with baccalaureate or other initial professional education, such as nursing and include postdoctoral training)	
INSTITUTION AND LOCATION		DEGREE (if applicable)	YEAR(S)
Bucknell University, Lewisburg, PA		B.A.	1975
Bucknell University, Lewisburg, PA		B.A.	1975
University of Florida, Gainesville, FL		M.Stat	1979
University of Florida, Gainesville, FL		Ph.D.	1982
FIELD OF STUDY			
		Mathematics	
		Economics	
		Statistics	
		Statistics	

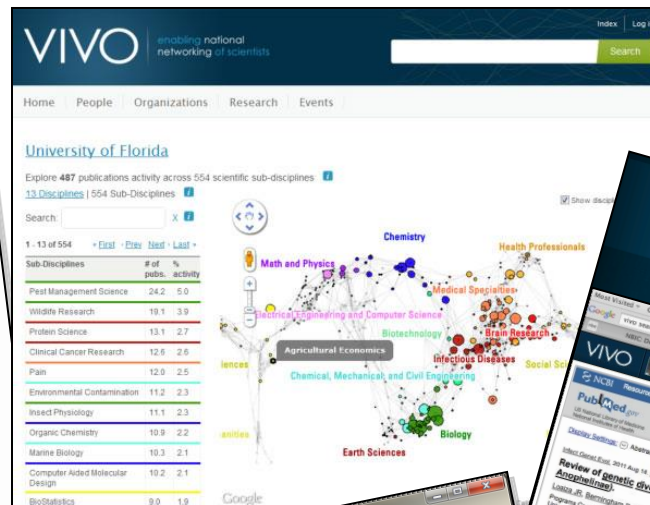
A. Positions and Honors

Positions and Employment

2008-	Interim Director, Biomedical Informatics, College of Medicine, University of Florida.
2008-	Associate University CIO, IT Architecture
2008-	Associate Director, Clinical and Translational Science Institute, University of Florida.
2008-	Interim Director, Clinical and Translational Informatics Program, University of Florida.
2008-	Research Associate Professor, Department of Epidemiology and Health Policy Research, University of Florida
2005-08	PeopleSoft Implementation Officer, University of Florida
2002-	Director of Data Infrastructure, University of Florida
2002-	Co-founder and Chief Technology Officer, MarCon Global Data Solutions, Incorporated
2002-03	Assistant Vice President for Health Affairs, Academic Information Systems and Support and
1997-02	Information Officer, University of Florida Health Science Center
1993-07	Director of Information Resources and Technology Programs, College of Medicine, University of Florida
1992-08	Research Associate Professor, Department of Epidemiology and Health Policy Research, University of Florida
1982-83	Asst. Dir. of Acad. Computing, CTI
1980-83	Director, Statistical Consulting Center

Other Experience

2009-	Member, InCommon working group
2008-	Chair, Health Science Center Informatics
2008-	Member, Health Science Center Informatics
2008-	Chair, University Planning Group
2008-09	Member, Health Science Center Informatics
2007-08	Member, Educare Working Group
2004-	Chair, Information Technology Advisory
2003-	Editor, AmStat OnLine, American Statistical Association
2003-05	Member, Information Technology Advisory
2002-	Computing
2002-03	Chair, University Directory Services
2001-03	Member, Microsoft national Higher Education



Computer Aided Molecular Design 10.2 2.1

BioStatistics	9.0	1.9
Dental Education	9.0	1.8
Hormone Research	9.0	1.8

University of Florida
University of Florida
Officer, MarCom Global Data Solutions, Incorporated
Affairs, Academic Information Systems and Support and Chief
Florida Health Science Center
s and Technology Programs, College of
University of Florida

Home | VIVO Search
beta Search
Find research and expertise
Enter keywords.
People include faculty members, librarians, staff, and students.
Try these keywords: alternative energy, bioinformatics, nanotechnology, and more.
Publications
People
Publications
Organizations
Activities
Events
Courses
Equipment
Distribution of institutional data
Publications
Courses
Events
Organizations
People
A demonstration of multi-institutional search
A group of seven top research institutions dedicated to facilitating global
efforts recognize the challenges faced by researchers in standardizing the
data and have decided to join forces in standardizing the VIVO software
and their

search.org/

CTSI Home | Clinical and Translational Science Institute

Search the CTSI

NEWS • SITE MAP • PEOPLE

About • Research • Education • Community • Contact

CTSI Home

Executive Operations Committee

Leadership Group

Stakeholders Group

Program Directors

Core Lab Directors

Clinical Research Unit Directors

UF CRC Scientific Advisory Committee

Internal Advisory Committee

CTSI Home

Recent Articles

08/08/2011
Applications due Sept. 16 for CTSI K12 Multidisciplinary Program for Junior Faculty

08/07/2011
Proposals due Sept. 28 to UF Pepper Center for pilot studies on tobacco and prevention of

Nelson, D
Director
Phone: 3523928700
nelson@ctsi.ufl.edu
<http://ctsi.ufl.edu/people/nelson11937>

Costin, Michael
Associate Director and Chief Operating Officer
Phone: 3522738872
mcostin@ctsi.ufl.edu
<http://ctsi.ufl.edu/people/costin12562>

Barak, Claire
Assistant Director, Communications
Phone: 3522738211
cbarak@ctsi.ufl.edu
<http://ctsi.ufl.edu/people/barak1192644>

Dr. H. Martin

VIVO search scenarios

- Multiple campuses of one university
- Regional connections
 - e.g., Illinois ties with regional federal labs
- Consortia – 62+ CTSAs, USDA plus land grant universities
- International
 - 13 Netherlands universities and the National Library
 - German Universities
 - AgriVIVO – UN FAO



CTSAsearch Home

CTSA Search
Participation Details

Google Search

Polyglot Home

Federated Search

What is CTSAsearch?

CTSAsearch is a prototype demonstrating federated search using Linked Open Data published by members of the CTSA Consortium and other interested parties. To try it out, use the form below or click on the "CTSA Search" entry in the menu on the left.

Search for Investigators at Multiple Institutions

Current Status

- Total persons indexed: 48,544
- Total publications by those persons indexed as part of their profile: 450,131

Currently Harvested Sites	Platform
Cornell University	VIVO
Northwestern University	SciVal Experts and VIVO
Oregon Health Science University	SciVal Experts
University of California, San Francisco	Profiles
University of Florida	VIVO
University of Iowa	Loki

Indexed Content

- Persons and their associated properties (name, research statement, etc.)
- Academic Articles for each person with associated properties. Where DOIs or PMIDs exist additional information is added from MEDLINE, including
 - Abstract
 - Keywords
 - MeSH terms
 - Chemicals
 - Genes

We currently use pmid2doi data from from crossref.org and pmid2doi.org to crosswalk DOIs to PMIDs.

We harvest linked open data through SPARQL endpoints using queries based on the VIVO ontology. If you would like to participate, contact Dave Dickinson with details on how to access your SPARQL endpoint.

Known Issue: Data for Cornell University and Indiana University is incomplete. We continue to gather complete data from the seven partner institutions.

VIVO Search

Find research and expertise

http://vivosearch.org/

alzheimer

People



People Publications 177 Organizations 29 Activities 14 Events 8 Courses Equipment

113 results

Morris, John Carl

... but not tau **Alzheimer** pathology in cognitively normal aging. Morris, John Carl The portable CDR: translating the clinical dementia rating interview into a PDA ...

WashU in St. Louis School of Medicine

Rubin, Eugene Harold

... Prof of Psychiatry Rubin, Eugene Harold Rubin, Eugene Harold Very mild senile dementia of the **Alzheimer** type. I. Clinical assessment. Rubin, Eugene ...

WashU in St. Louis School of Medicine

Results by Institution

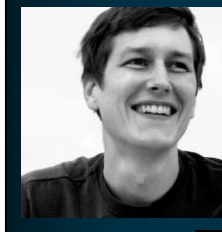
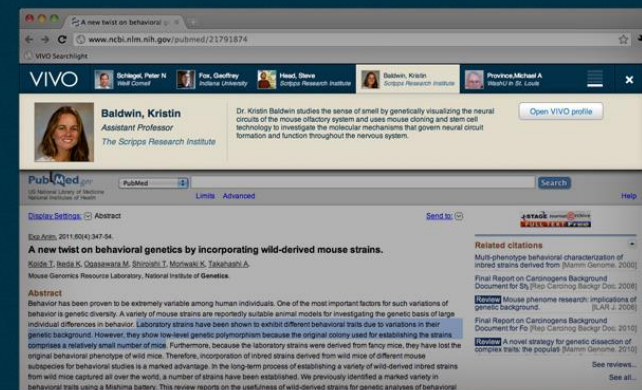
WashU in St. Louis School of Medicine	52
University of Florida	35
Harvard University	11
Weill Cornell Medical College	8
Cornell University	4
The Scripps Research Institute	3

VIVO Searchlight

A convenient way to find researchers

http://vivosearchlight.org/
@mileswortho

Searchlight is a small app that automatically shows you VIVO profiles related to the page you're reading.



AgriVIVO

HOME SEARCH TOOLS ABOUT CONTACT

AgriVIVO is a search portal built to facilitate connections between all actors in the agricultural field, bridging across separately hosted directories and online communities. **This is a prototype**

You can search for **people, organizations and events**. Read more on **how to have data included** in AgriVIVO. Read our new **FAQ**, and our **terms of use**.

Last import date (pilot): 27/01/2013 - Next import: early May 2013

9 DATA PROVIDERS 107 PEOPLE 4,186 ORGANIZATIONS 73 EVENTS

AgriVIVO Tools

AgriVIVO SEARCHLIGHT VIVO connect + share + discover

Q Search for people

Enter keywords... Search

Examples: "climate change", "capacity building", "rural development", "information management"

Search by location

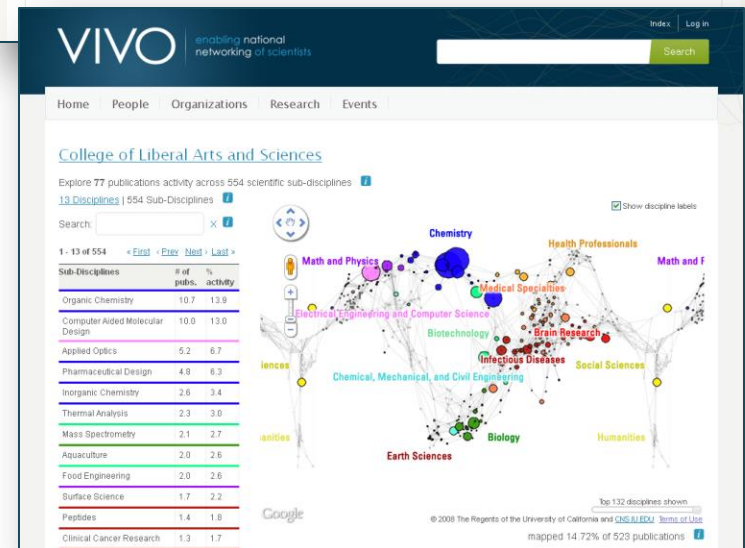
- Choose a country -

View map

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VIVO Community



Pages

PAGE TREE

- [Introduction](#)
- [VIVO Technical Documentation](#)
- [Working Groups and Task Forces](#)
- [Community](#)
- [Search the VIVO wiki](#)

Pages

VIVO

Created by Jim Blake, last modified by Jon Corson-Rikert on Jan 30, 2015

VIVO is an open source [semantic web tool](#) for research discovery for finding people and the research they do. Originally funded by the U.S. National Institutes of Health, VIVO supports editing, searching, browsing and visualizing research activity across disciplines. VIVO's search returns results faceted by type for rapid retrieval of desired information across disciplines at one institution or, through a prototype at [vivosearch.org](#), across multiple distributed institutions.

What is VIVO?

- [Introduction | A short tour of VIVO | FAQs](#)
- VIVO is used at [many institutions](#) including international ones
- The latest version of VIVO is 1.7, released in June of 2014. See [what's new](#).
- Follow us on social media – [Twitter](#), [blog](#)
- The VIVO project is a part of [Duraspace](#). Learn how to support VIVO through [institutional membership](#) in Duraspace.

Developers

- VIVO is a Java Enterprise application built around the Jena Semantic Web Framework. [Download VIVO's source code on GitHub](#)
- [Installation and upgrade guides](#)
- Want to quickly install and evaluate VIVO? Install a [VIVO Vagrant profile](#)
- Standing working groups
 - [Apps and Tools Working Group](#) – VIVO works with a variety of apps and tools to aid in data import, export, and reuse.
 - [Implementation and Development Working Group](#)
 - [VIVO-ISF Ontology Working Group](#)
- Shorter term, focused [task forces](#) and the process of proposing them

Calendar

The VIVO community offers a variety of workgroup sessions, conferences, and hackathons.

Tuesday, February 3

- 1:00pm [VIVO-ISF ontology open office hours](#)
- 3:00pm [VIVO i-fest planning call \(biweekly\)](#)

Thursday, February 5

- 1:00pm [Implementation/Development Call](#)

Friday, February 6

- 1:00pm [VIVO Steering Group](#)

Monday, February 9

- 4:00pm [VIVO Management Team](#)

Thursday, February 12

Events shown in time zone: Eastern Time



Participate in the community

- Have a question?

VIVO projects around the world



<https://wiki.duraspace.org/display/VIVO/Sites+implementing+VIVO>

Current and future VIVO efforts



VIVO Updates

VIVOs

- 120+ impl. & pilot projects
- 35+ countries
- 15+ CTSAs

Standards

- CTSAconnect Integrated Semantic Framework ontology
- ORCID
- CASRAI
- others

Partners

- Symplectic
- euroCRIS
- W3C, DERI, ConceptWeb Alliance, OpenPHACTS
- Institutions/organizations

Events

- VIVO conference Aug. 2015
- Spring Implementation Fest @ OHSU
- DuraSpace VIVO webinars

Community

- VIVO wiki
- Listservs
- Weekly calls
- GitHub
- vivoweb.org
- @VIVOcollab

What roles can the library play?

Libraries:

- Are a trusted, neutral entity
- Have a tradition of service and support
- Strive to serve all missions of the institution
- Are technology centers and have IT and data expertise

Library Staff:


- Have skills—information organization, instruction, usability, subject expertise
- Have close relationships with their clients (buy in)
- Understand user needs
- Understand the importance of collaboration and know how to bring people together
- Have knowledge of institution, research, education, clinical landscape

What roles can the library play?

Librarians are successfully stepping up to the semantic web plate in a variety of roles related to institutional research networking platforms.

- Outreach and adoption activities
- Education and training on the use of the platform
- Ontology and controlled vocabulary expertise, extending the model
- Negotiations with data providers
- Programming, technical support
- Workgroup representation
- ...and more!

Research networking also provides an opportunity for libraries to become familiar with many concepts around linked open data and the semantic web.



Acknowledgements

Funding:

- Northwestern University Clinical and Translational Sciences Institute, NIH award UL1TR000150
- VIVO, NIH award U24 RR029822
- VIVO/DuraSpace

Questions/Follow-up:

- kristi.holmes@northwestern.edu
- kristi@vivoweb.org
- **Twitter:** @kristiholmes

Thanks!