

# VIVO: A DuraSpace Incubator Project

Dean B. Krafft  
Chair, VIVO Management Team

DuraSpace Summit  
March 11, 2014

VIVO

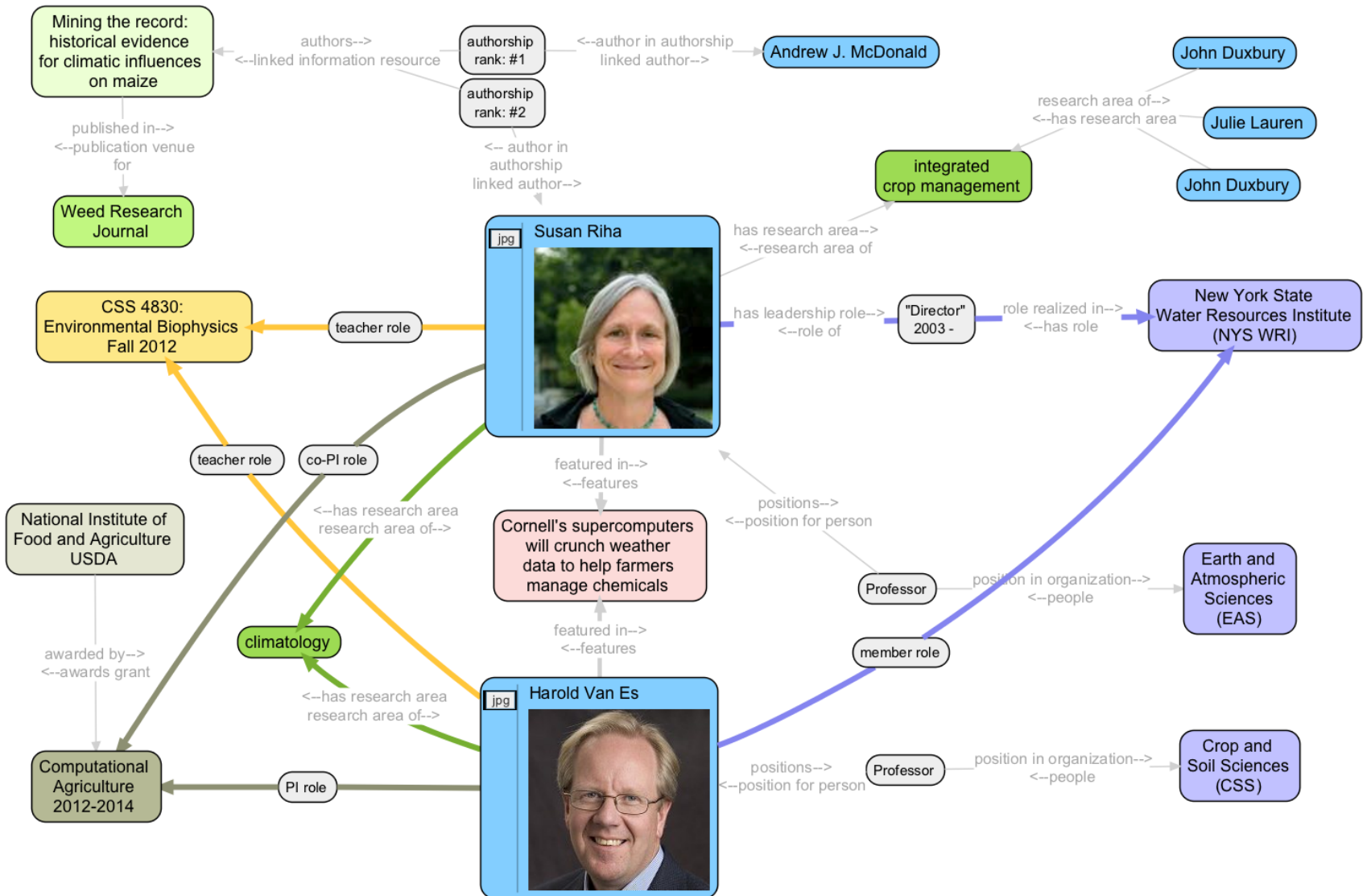
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DURASPACE™

# What is VIVO?

- Software: An open-source semantic-web-based researcher and research discovery tool
- Data: Institution-wide, publicly-visible information about research and researchers
- Standards: A standard ontology (VIVO data) that interconnects researchers, communities, and campuses using Linked Open Data
- Community: An open community with strong national and international participation

# VIVO connects scientists and scholars with and through their research and scholarship



# Software

# The VIVO/Vitro Software

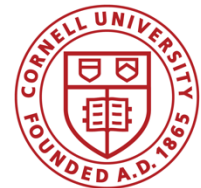
- Ingest tools – getting batch data in
- Ontology editing tools – change what is being described and represented
- Instance editing tools – Edit instances of any of the things represented in the ontology (people, publications, organizations, etc.)
- Template/display system – Display instances and sets in a useful way

# Software Release History

- 0.9 – Jan 2010 – 1<sup>st</sup> multi-institutional development release
- 1.0 – April 2010 – Feature complete release
- 1.1 – July 2010 – Visualizations, ontology
- 1.2 – Feb 2011 – Templating, storage model
- 1.3 – July 2011 – Search, authorization
- 1.4 – Dec 2011 – Proxy editing, external vocab.
- 1.5 – July 2012 – Extensibility, OpenSocial

# Latest 1.6 Release – Dec. 2013

- VIVO-ISF ontology
- Web service for the RDF API
- Multi-language support and repository
- HTTP caching headers
- Search indexing
- Landing page improvements
  - Highlighted content
  - Geographic research focus map
- Developer tools

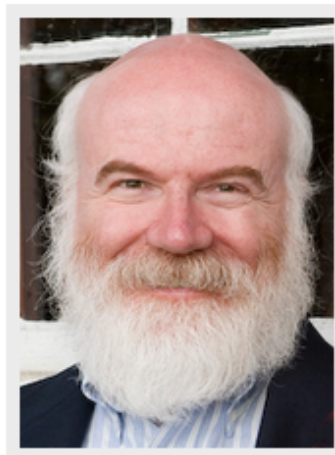


VIVO

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## Krafft, Dean Blackmar | Cornell Academic Staff



### Positions

› Senior Research Associate, [Lib Administration](#)

Dr. Krafft received his Ph.D. in Computer Science from Cornell University in 1981. Since the 1990s, he has been involved in digital library research, most recently heading the National Science Digital Library project at Cornell. In July 2008 he joined the Cornell University Library as Chief Technology Strategist, while retaining a Senior Research Associate appointment in Information Science. In August 2010, he became the Director of IT for the Cornell University Library in addition to con (... [more](#))

### Websites

[Digital Libraries web page](#)

### Networks

 [Co-Authors](#)

 [Co-Investigators](#)

 [Map Of Science](#)

[Affiliations](#)[Research](#)[Publications](#)[Background](#)[Identity](#)[View All](#)



# SKE Knowledge Environment

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**SKE** 中科院专业领域知识环境  
Subject knowledge Environment, CAS



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当前位置：中科院专业领域知识环境

## 科研动态

[更多>>](#)

- Occurrence, partition and removal of pharmaceuticals in sewage water and sludge during wastewater treatment
- Biodiversity and population dynamics of microorganisms in a full-scale membrane bioreactor for municipal wastewater treatment
- Displacement Mechanism of Binary Competitive Adsorption for Aqueous Divalent Metal Ions onto a Novel IDA-Chelating Resin: Isotherm and Kinetic Modeling
- Characterization and use of Moringa oleifera seeds as biosorbent for removing metal ions from aqueous effluents.
- 生物物理所合作研究发现Tudor识别对称双甲基化精氨酸的方式 | 2010-09-10
- 水体污染与控制治理知识环境建成了陈德桂研究组发现新组蛋白去甲基化酶及其调控机理 | 2010-6-25
- 西双版纳植物园热带榕树生理研究新进展 | 2010-6-25

## 公告

[更多>>](#)



昆明植物所所长李德铎出席上海世博会英国国家馆日活动并被授予皇室勋章

- 2010年国际遗传工程与生物技术中心(ICGEB) RNA Processing in Biology and Medicine 会议新一轮通知
- 植物所植物水分养分生物学创新研究组博士后招聘启事 | 2010-08-25 | [中国科学院植物研究所](#)
- 武汉物理和数学研究所生物分子核磁共振研究组招聘启事 | 2010-6-28
- 紫金山天文台招聘启事 | 2010-6-25
- 关于中国博士后低碳经济与洁净能源的科技与发
- 展学术论坛的征文通知 | 2010-6-22
- 关于受理2010年度湖泊与环境国家重点实验室开放基金申请的通知 | 2010-6-21

## 业界新闻

[更多>>](#)



Water treatment plant recognized for optimal performance

- Daily SEQ water use rises slightly
- EPA Signs Agreement with Southampton Hospital to Enhance its Environmental Practices
- EPA Press Conference Call on Final Standards to Protect Florida's Waters
- Water contamination case allowed to continue
- "喜马拉雅雪冰的沉积黑碳威胁世界第三极"
- 雪冰细菌可能记录气候变化



中国第四次北极科学考察创造多项新纪录 | 2010-09-13

Quick Search

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国科图服务公告

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- 欢迎参加“青年与生物多样性——关爱生命·守护地球”主题环保公益活动
- 中国科学院国家科学图书馆人才招聘启事

服务直达

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国家科技图书文献中心  
NSTL

<http://ske.las.ac.cn/>



Baeten, prof.dr. J.C.M. | Professor

Positions

► Professor, [Model Driven Software Engineering](#), [Department of Mathematics and Computer Science](#)

Research Areas

[Computer science](#) | [Model based systems engineering](#) | [Science and technology](#) | [Supervisory control synthesis](#) | [Systems engineering](#) | [Theoretical computer science](#)

Publications in VIVO



69 in the last 10 full years (178 total) *i*



[Co-Author Network](#)



[Map Of Science](#)



✉ [i.c.m.baeten@tue.nl](mailto:i.c.m.baeten@tue.nl)

📞 2904

► [Personal site](#)





# VIVO

RESEARCH & EXPERTISE ACROSS CU-BOULDER

[Home](#) | [People](#) | [Research](#) | [Organizations](#) | [About](#) | [Contact Us](#)

## Welcome to VIVO CU-Boulder

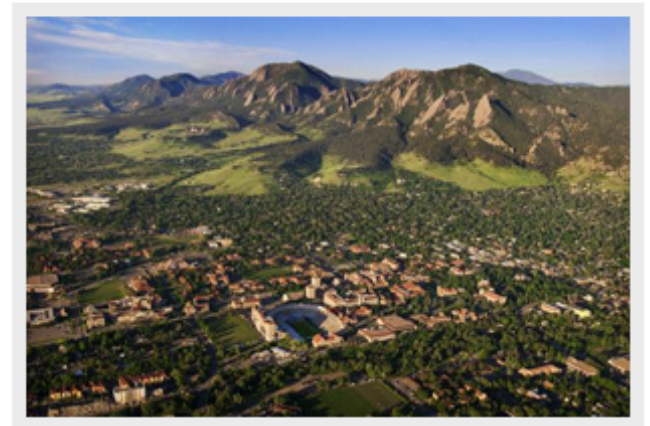
VIVO is a research and expertise discovery tool that enables collaboration among researchers across all disciplines.

Browse or search information on CU-Boulder people and research.

## Search VIVO

## For Faculty

Need to update your faculty profile? Click [here](#) to find out how.



## A Celebration of Faculty Achievement

Faculty Affairs is pleased to recognize CU-Boulder's faculty for their important work. This annual publication features awards at the campus level and beyond.

# Research Hub



Log In

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- Researchers
- Groups
- Projects
- Publications
- Collections
- Services
- About
- Help
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## Connect with Griffith Researchers

**Know more. Do more.**



### Quantum computing expert is Young Tall Poppy

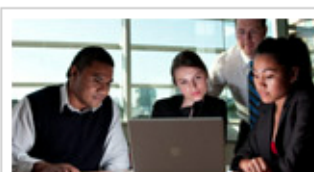
The revolutionary solutions offered by quantum computing are under the spotlight as Griffith's Dr Erik ... read more

### Find a

Researcher  Keyword

Name

Welcome to Griffith University's Research Hub, a rich and informative guide to the University's expertise in a comprehensive array of academic fields.



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Research Groups



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Griffith University is a Top 10 Australian research university. Analysis of the Excellence in Research for Australia 2010 National Report places Griffith among Australia's most highly regarded universities, with close to 93 per cent of staff aligned with fields of research rated world standard or above.



# Find An Expert

## Search Find an Expert

Search for experts, by name or research topic

1 - 10 of 32 search results for kangaroo

### Marilyn RENFREE (Zoology)

- Research Interests
- Publications
- Research
- Contact Details
- View Full Profile

#### Matching Research

- Kangaroo** Genome Resource Management Facility
- ARC CENTRE OF EXCELLENCE FOR **KANGAROO** GENOMICS
- KANGAROO** GENOME CENTRE OF EXCELLENCE

[More...](#)

### Filter results by...

#### Supervisor Availability

Available (16)

#### Department

Zoology (15)

Veterinary Science (8)

Science (1)

Resource Management and Geography (1)

Botany (1)

### David MORGAN (Zoology)

## Bienvenido a VIVO

VIVO es una herramienta de descubrimiento enfocada en la investigación que permite la colaboración entre científicos en todas las disciplinas.

Revise o busque información sobre personal académico, estudiantes, etc., facilidades de espacios, departamentos, cursos, apoyos a proyectos y publicaciones en el Colegio de Postgraduados en Ciencias Agrícolas, México.

## Buscar en VIVO

Buscar

## Iniciar sesión

Correo

Contraseña

Iniciar

## Navegar por

[Personas](#) (89)

[Actividades](#) (12)

Académico, Personal

Académico externo



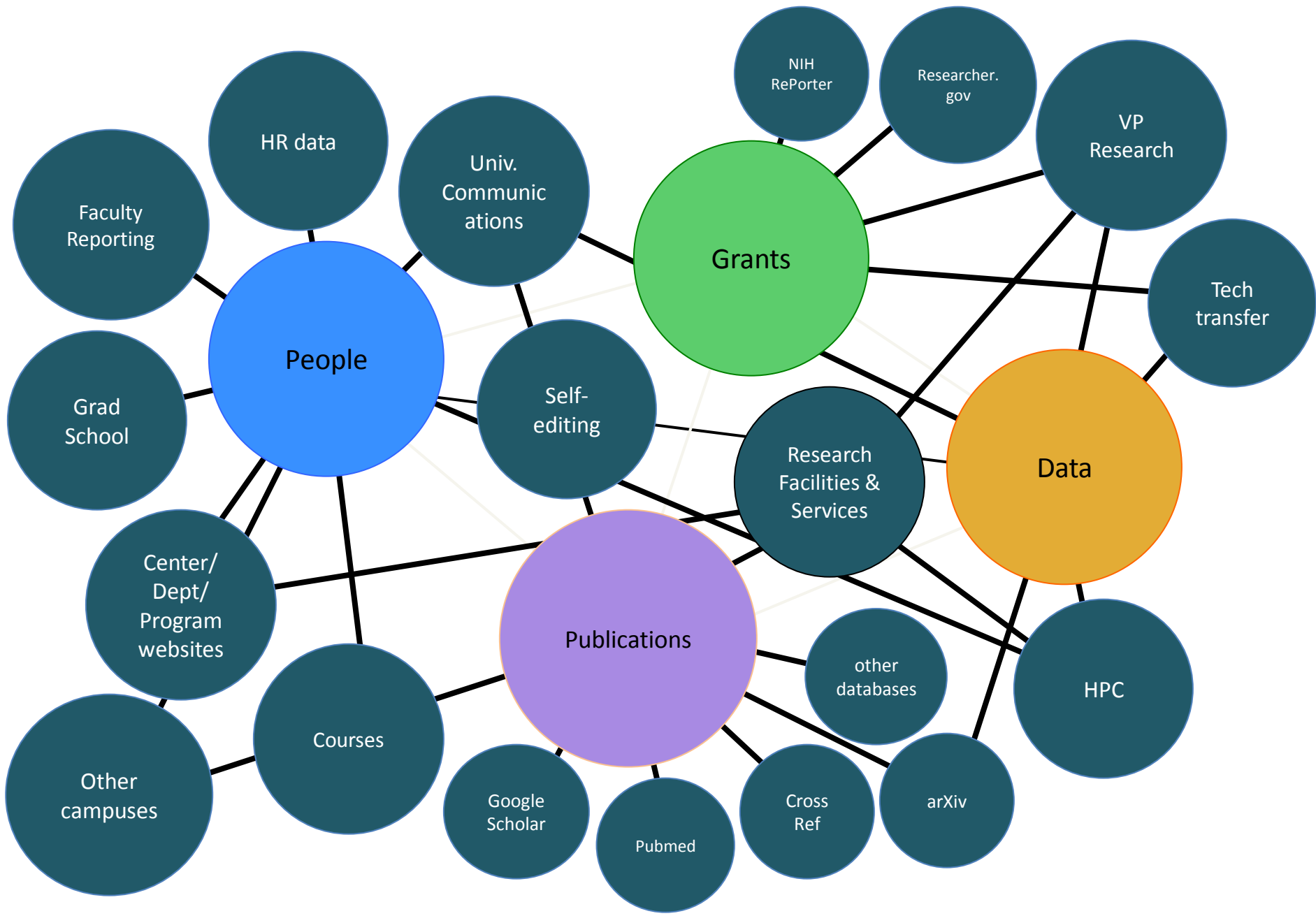
# Structured Data using a Standard Ontology

# Why is VIVO data important?

- It is the only standard way to exchange information about research and researchers across diverse institutions
- It provides authoritative data from institutional databases of record as Linked Open Data
- Structured VIVO data supports search, analysis and visualization across institutions and consortia
- The ontology is highly flexible and extensible to cover research resources, facilities, datasets, and more



# VIVO Normalizes Complex Inputs



# An HTTP request can return HTML or data

Conlon,Michael

Marbles - Conlon, Michael

http://vivo.ufl.edu/individual/n25562

http://vivo.ufl.edu/individual/n25562

marbles

Open

## Conlon,Michael

type

- [Person](#)
- [Thing](#)
- [Agent](#)
- <http://vivoweb.org/ontology/core#FacultyMember>
- <http://vivoweb.org/ontology/core#Faculty>

label

- Conlon,Michael

<http://vivoweb.org/ontology/core#featuredIn>

- <http://vivo.ufl.edu/individual/n6868>
- <http://vivo.ufl.edu/individual/n3884>
- <http://vivo.ufl.edu/individual/n6584>
- <http://vivo.ufl.edu/individual/n180>


**VIVO** Enabling National Networking of Scientists

Home People Academic Units Research Events & Seminars

### Conlon,Michael

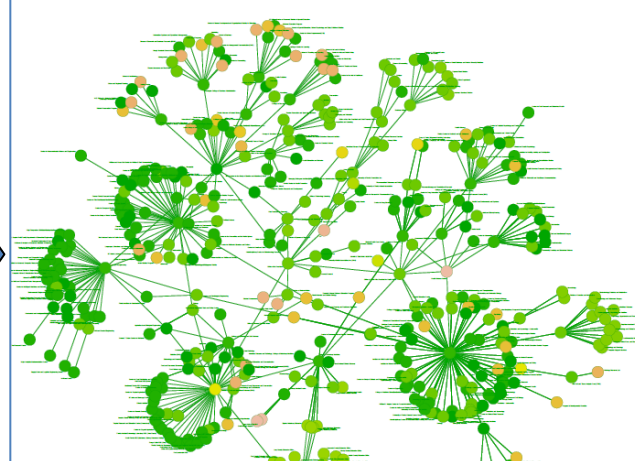
Associate CIO, IT Architecture

[Personal web page](#) | [Clinical and Translational Science Institute Home](#)



**description**

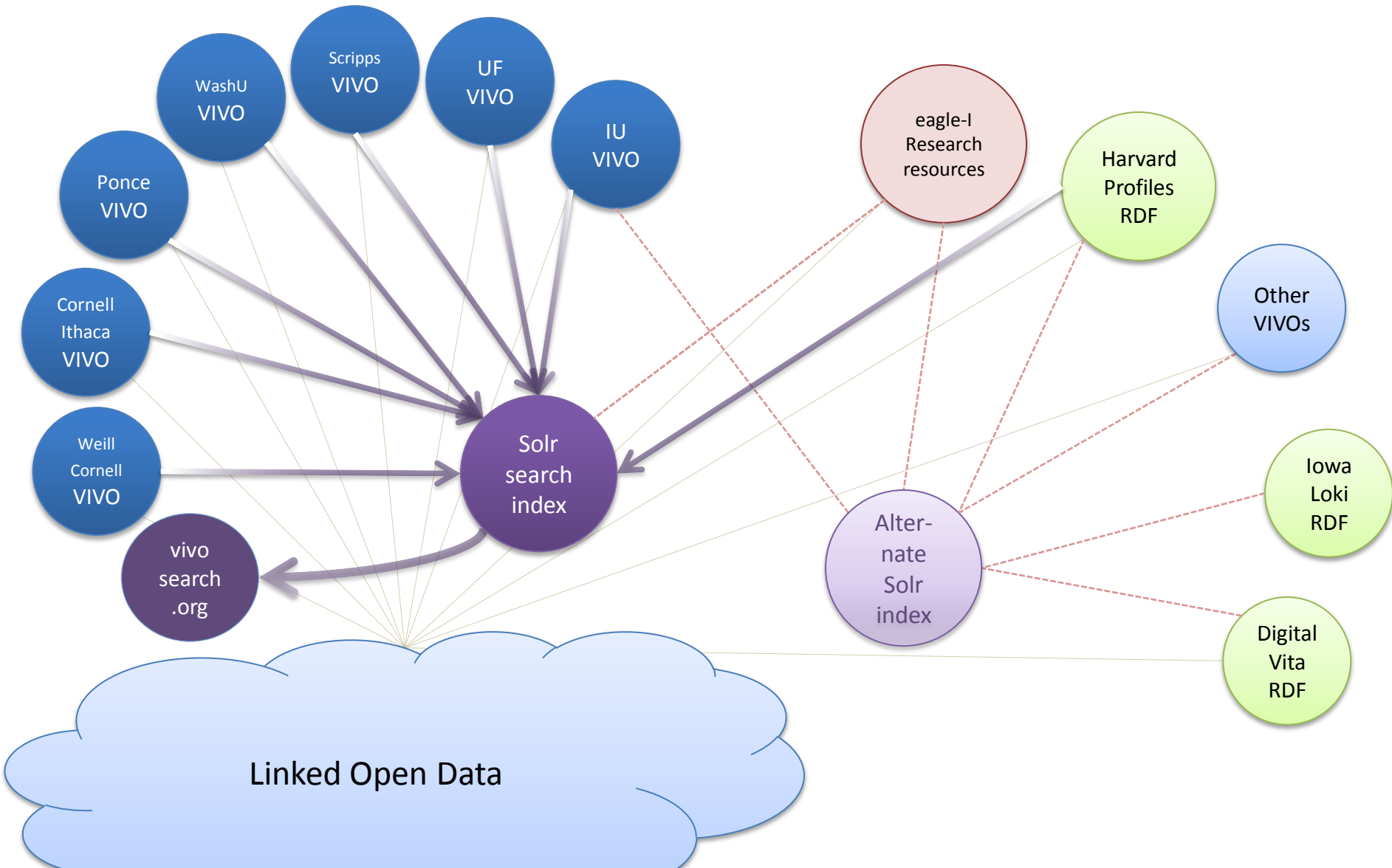
Dr. Conlon is Associate CIO for IT Architecture, interim Director of Biomedical Associate Director of the university's Clinical and Translational Science Institute, National Networking of Scientists. His responsibilities include development of



# Compatible with VIVO-ISF

- Harvard Profiles – Biomedical focus, with over 40 installations
- VIVO – University focus, all disciplines, at least 70 installations in progress
- Loki – Univ. of Iowa, home of CTSAssearch
- SciVal Experts with VIVO extension module, Elsevier is a VIVO Corporate Founding Sponsor

# Linked data indexing for search



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

## Find research and expertise

People


- People
- Publications <sup>78</sup>
- Organizations <sup>9</sup>
- Activities <sup>10</sup>
- Events
- Courses
- Equipment

74 results

**Lohman, Timothy M**  
 ... Timothy M Escherichia **coli** DNA helicases: mechanisms of DNA unwinding. Lohman, Timothy M Structure of the DNA binding domain of **E. coli** SSB bound to ssDNA ...  
 WashU in St. Louis School of Medicine

**Moraru, Carmen I**  
 ... Inactivation of **E. coli** ATCC 25922 and **E. coli** O157:H7 in apple juice and apple cider using Pulsed Light treatment Moraru, Carmen I Commercial Advertising ...  
 Cornell University

**Hultgren, Scott James**  
 ... of pilus subunit recognition by the PapD chaperone. Hultgren, Scott James Structural basis of the interaction of the pyelonephritic **E. coli** adhesin to its ...  
 WashU in St. Louis School of Medicine

**Wilson, David B**  
 ... Wilson, David B The enzymes of the galactose operon in **E. coli**. IV. The frequencies of translation of

### Results by Institution

Cornell University	49
WashU in St. Louis School of Medicine	17
University of Florida	4
The Scripps Research Institute	2
Harvard University	1
Weill Cornell Medical College	1
Indiana University	0
Ponce School of Medicine	0

### Results by Type

Faculty Member	64
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## CTSAsearch Home

CTSA Search

CTSA Community Map

CTSA Institution Map

Participation Details

## Custom Maps

Chicago Women in STEM  
Map

## Comparison Approaches

Google Search

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 to see a ranked list of matching investigators. Use the second form or click on the "CTSA Map" entry in the menu to visualize coauthorship amongst the matching investigators.

## Search for Investigators at Multiple Institutions

<input type="checkbox"/> Display map	<input type="radio"/> Text only
	<input type="radio"/> Text and UMLS concepts
	<input checked="" type="radio"/> UMLS concepts (including support for boolean search using &,  , and !)
<input type="text"/>	<input type="button" value="Search"/>

## Current Status

- ⌘ SPARQL endpoints queried: 10
- ⌘ Institutions indexed: 19
- ⌘ Total persons indexed: 124,945
- ⌘ Total publications by those persons indexed as part of their profile: 1,325,716
- ⌘ Total co-author pairs (two people on the same paper): 2,036,131
- ⌘ The harvesting times listed below are the times required to interrogate the respective SPARQL endpoints and cache the results locally at Iowa.

# VIVO Dashboard

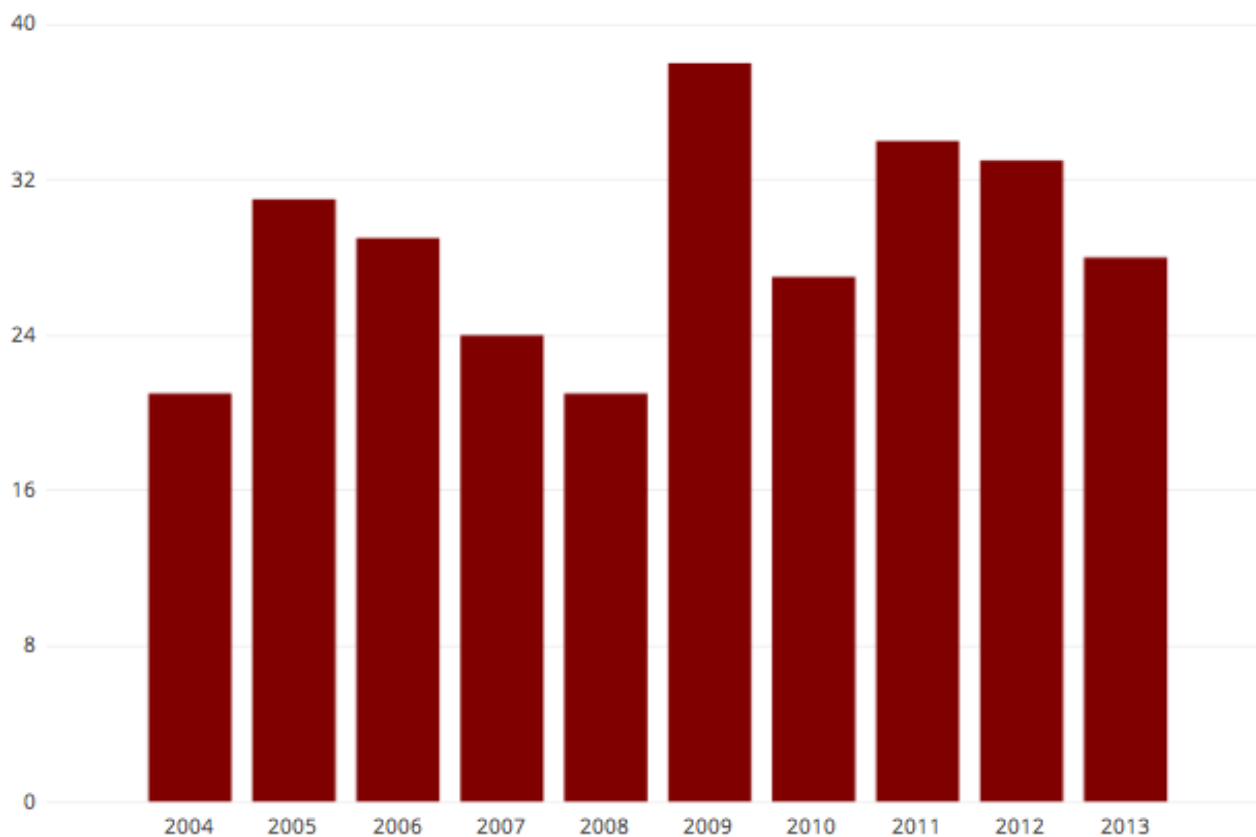
A Drupal-based tool for visualizing semantic data

Publications

## Publications

[Graph](#) | [List](#) | [Export](#)

Total: 591



### Current Filters

(x) Full Time WCMCFaculty

(x) Academic Article

[Clear all](#)

**Year** 1953 - 2013



### Publication Type

Academic Article

Letter (11)

Comment (8)

[Show more](#)

**Journal Ranking** 0 - 15



### Journal Name

### Author Name

# University of Florida

Explore activity (13,692 publications) across 554 scientific subdisciplines i

- Explore University of Florida i
- Compare organizations i

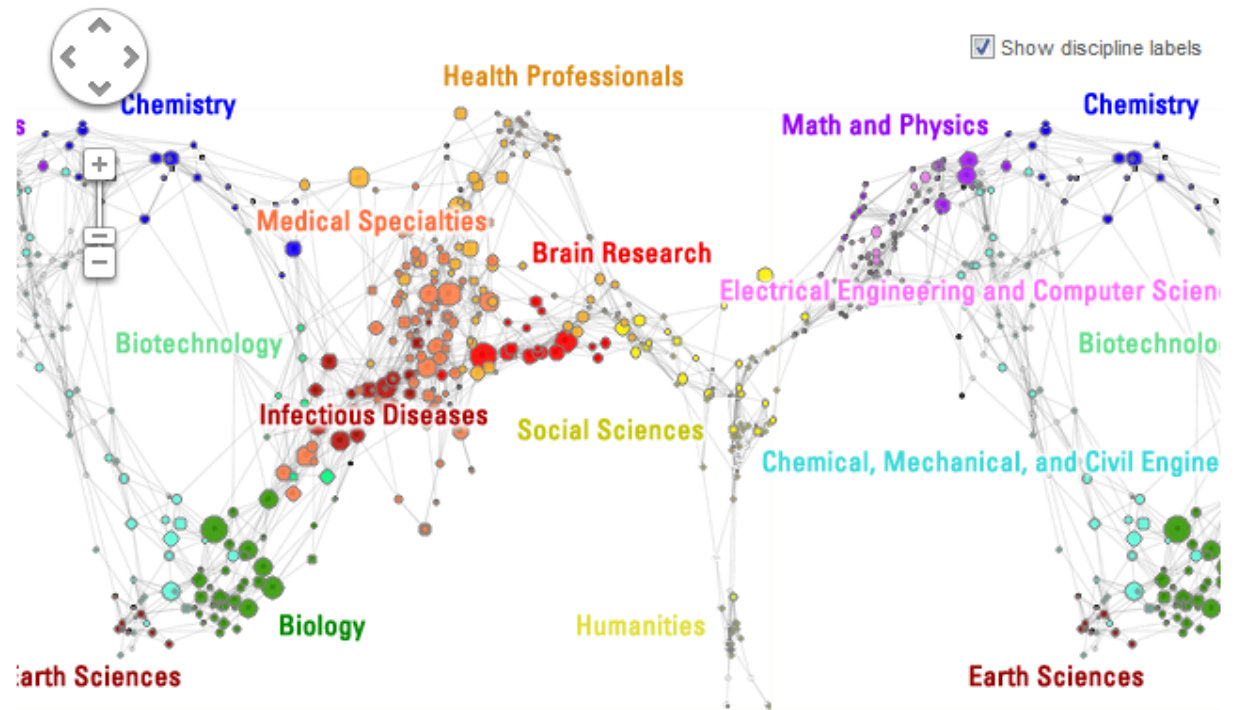
554 Subdisciplines | [13 Disciplines](#) i

Search:  X i

1 - 10 of 554 [« First](#) [« Prev](#) [Next »](#) [Last »](#)

Subdisciplines	# of pubs.	% of activity
Neuroscience; Molecular & Cellular	283.0	2.1
Horticulture	264.6	1.9
Circulation	229.6	1.7
Neuroscience Methods	186.7	1.4
Insect Physiology	175.4	1.3
Clinical Cancer Research	173.9	1.3
Veterinary Medicine	164.0	1.2
Molecular Medicine	163.7	1.2
Pain	157.1	1.1
Transplantation	150.7	1.1

[Save All as CSV](#)



Show discipline labels

Top 518 disciplines shown



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Map updated by [SciTech Strategies](#), [OST](#), and [CNS](#) in 2011.

[Terms of Use](#)

mapped 79.21% of 17,285 publications i

[Save Unmapped Publications](#)



# CALS Research and Impact

Information about CALS research projects and their impact throughout the world



SEARCH

HOME

BROWSE PROJECTS

PROJECT LOCATIONS

SEARCH

*International and domestic locations where CALS research focuses*

New York State

United States

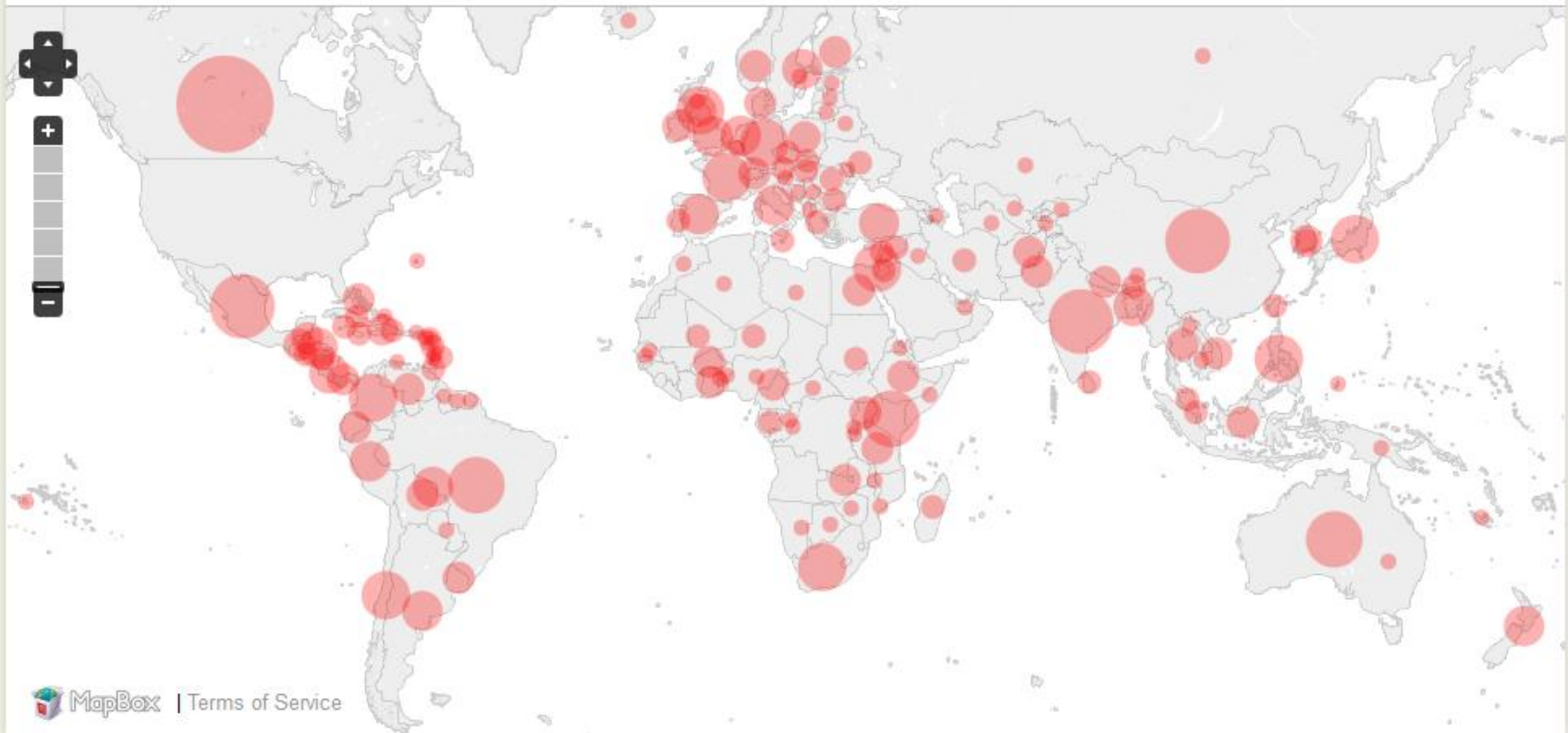
International

## International

*407 projects focusing on 178 locations*

Choose a location

GO



# Value for institutions and consortia

- Common data substrate
  - Public, granular and direct
  - Discovery via external and internal search engines
  - Available for reuse at many levels
- Distributed curation
  - E.g., affiliations beyond what HR system tracks
  - Data coordination across functional silos
  - Feeding changes back to systems of record
  - Direct linking across campuses
- Data that is visible gets fixed

# Example: U.S. Dept. of Agriculture

- Multiple agencies including Agricultural Research Service and U.S. Forest Service
- VIVO portal for 45,000 intramural researchers
- Goal to link to Land Grant universities and international agricultural research centers
- Using VIVO as an integration tool to send data for federal STAR METRICS/SciENCv projects

# Community

# The VIVO Community is now over 100 institutions worldwide



# Interim VIVO management team

- Dean Krafft, Cornell University
- Jon Corson- Rikert, Cornell University
- Paul Albert, Weill Cornell Medical College
- Mike Conlon, U of Florida
- Bill Barnett, Indiana University
- Robert McDonald, Indiana University
- Kristi Holmes, Washington U in St. Louis
- Jonathan Markow, DuraSpace

# VIVO working groups

Working Group	Lead	Co-Lead
Apps & Tools	Chris Barnes, University of Florida	Ted Lawless, Brown University
Implementation	Alex Viggio, Digital Science	Paul Albert, Weill Cornell Medical College
Engagement	Kristi Holmes, Washington University in St. Louis	Julia Trimmer, Duke University
Ontology	Melissa Haendel, Oregon Health & Science University	Brian Lowe, Cornell
Development	Jon Corson-Rikert, Cornell	Jim Blake, Cornell

New: Catalog of tools & maintainers at <https://wiki.duraspace.org/x/xusQAg>

# VIVO in DuraSpace

- Legal and administrative home for VIVO
- Provides assistance in outreach, sponsorship, and running a community source project
- Potential home for VIVO-based services
- Takes on financial backing of VIVO Annual Conference
- Identifying common models and synergies with DSpace and Fedora strengthens all three



# VIVO Sponsorship

- **Founding Sponsors:** American Psychological Association, Cornell University, Duke University, Griffith University, Indiana University, University of Colorado Boulder, University of Florida, University of Melbourne, University of Pennsylvania, Virginia Polytechnic Institute and State University (Virginia Tech), Weill Cornell Medical College
- **Founding Corporate Sponsors:** Symplectic, Elsevier
- **Sponsors:** Brown University (Gold); Memorial University, Newfoundland (Bronze); Oregon Health & Science University (Bronze)

# VIVO in 2014-15

- Hire VIVO Project Director as a DuraSpace employee (interviewing now)
- Significantly expand VIVO sponsorship: increasing budget from \$250K/yr to \$400K/yr
- Implement formal governance, aligned with DuraSpace model
- Continue to develop and extend VIVO and the VIVO-ISF ontology (more tomorrow)
- Support the continually growing VIVO community

# Getting Involved with VIVO

- VIVO Implementation Fest March 19-20
- VIVO Hackathon March 18
- Regular working group calls
- Meetups at other events like CNI, Force 11
- Advocacy for open standards and persistent identifiers
- Related DuraSpace and Hydra initiatives

# VIVO

connect  
share  
discover

5<sup>th</sup> Annual VIVO Conference  
August 6-8, 2014  
Austin, TX



[www.vivoconference.org](http://www.vivoconference.org)

# VIVO Keynotes: Sponsors hear first!

**Carole Goble, U. of Manchester**



**John Wilbanks, Sage  
Bionetworks**



# Extending VIVO

- Linked Data for Libraries (LD4L): 2 year Mellon-funded collaboration of Cornell, Harvard, and Stanford – “VIVO for Scholarly Information Resources”
- ORCID integration: Funded by Sloan/ORCID grant
- Ontology extensions: Knowledge Mobilization, ISF modules, AgriVIVO, Facilities, Datasets
- Apps & Tools: Analysis, Visualization, Integration

For More Information:

<http://vivoweb.org>

@VIVOCollab

(and for the real nitty-gritty attend the VIVO session tomorrow or check out

<https://wiki.duraspace.org/display/VIVO/>)

VIVO

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DURASPACE™