THE VIVO PROJECT

EUNIS VIGO 2023

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The RIM/CRIS systems

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RIM/CRIS systems

- Research data should be used by research organizations for strategic decision-making.

- To do this, research organizations have implemented or purchased Research Information Management (RIM) systems or Current Research Information Systems (CRIS), to support the aggregation, curation, and utilization of diverse data on institutional research activities

- RIM/CRIS systems provides significant value for research institutions: integrate local, internal data with external, global data, with new efficiencies and insights across the organization, as well as the potential for regional, national, and transnational sharing and benchmarking.

- There are several types of RIM/CRIS systems that are designed to support different functions, use cases, and workflows. At the global scale (e.g., ResearchGate, Google Scholar), national scale (e.g., NARCIS), or regional scale (e.g., Florida ExpertNet, Ohio Innovation Exchange), while others serve specific disciplinary communities (e.g., DIRECT2Experts) or individual institutions (e.g., VIVO, DSpace-CRIS, Symplectic Elements, Pure)

- RIM/CRIS systems support several use cases, including reputation management, research assessment, expertise discovery, data reuse, research intelligence and data analytics, and compliance.

RIM/CRIS systems

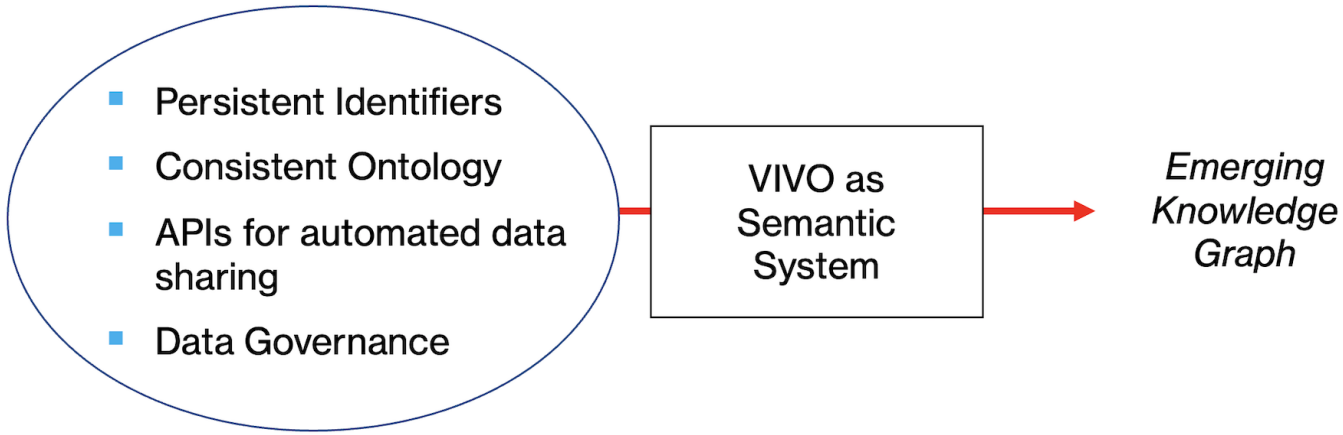
VIVO as a CRIS/RIM system, acts as a **hub of data** siloed in local and external systems through four strategies:

(1)The consistent use of persistent identifiers (PIDs) for people, objects, and institutions

(2) The use of reasonably consistent data models or ontologies across the systems

(3) The incorporation of application programming interfaces (API), so that data can be harvested and shared automatically;

(4) Community support for the development of a good data governance policies that balances openness and security



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The VIVO Community

Member-Supported Community

Open Source Community Supported program

LYRASIS

https://www.lyrasis.org/Pages/Main.aspx

- ✓ Software built by, for and with communities to showcase the scholarly activity, manage research discovery, experts finding, network analysis, and assessment of research impact, etc.
- ✓ Identifying common needs
- ✓ Affordable
- ✓ Institutions own and control their data
- ✓ Easily extended to support additional domains

VIVO Core Values

OPEN SOURCE

VIVO, and all VIVO components are provided as open source. Download at GitHub.

VIVO and all components of VIVO are open source. **Download from GitHub.**

USE

OPEN COMMUNITY

The VIVO community is open to everyone. You can follow the work of VIVO at the VIVO wiki.

The VIVO community is open to everyone. You can follow VIVO's work on our wiki.

JOIN

OPEN DATA

VIVO produces Linked Open Data which is easily shared and combined across VIVO sites.

VIVO produces linked open data that can be easily shared and combined across all VIVO sites.

SHARE

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Member-Supported Community

Duke University

Texas A&M University Libraries-College Station

Weill Cornell Medical College

Berlin University Alliance

Columbia University

SIGMA

Stanford University

Brown University

CINECA

University of New Mexico Health Sciences Center Clinical & Translational Science Center

Florida International University

George Washington University

Technical University of Denmark

Technische Informationsbibliothek (TIB)

University of California Davis

University of Idaho

University of Lausanne

University of Quebec in Montreal

VIVO Service providers:

Ontocale

VIVO Strategic partner (MOU):

euroCRIS

Other partners:

ORCID stands for Open Researcher and Contributor ID

SYMPLECTIC

Fedora™

DSPACE

casrai

Community Organisation

Leadership Group

Define the strategic direction

(+officers)

Commiters Group

Developers in charge of the maintenance and evolution of the VIVO base code.

Technical Lead

Users Groups

Community-created groups with common interests, grouped by region or zone:

- North American User Group
- German User Group
- Iberoamerica User Group

Interest Groups

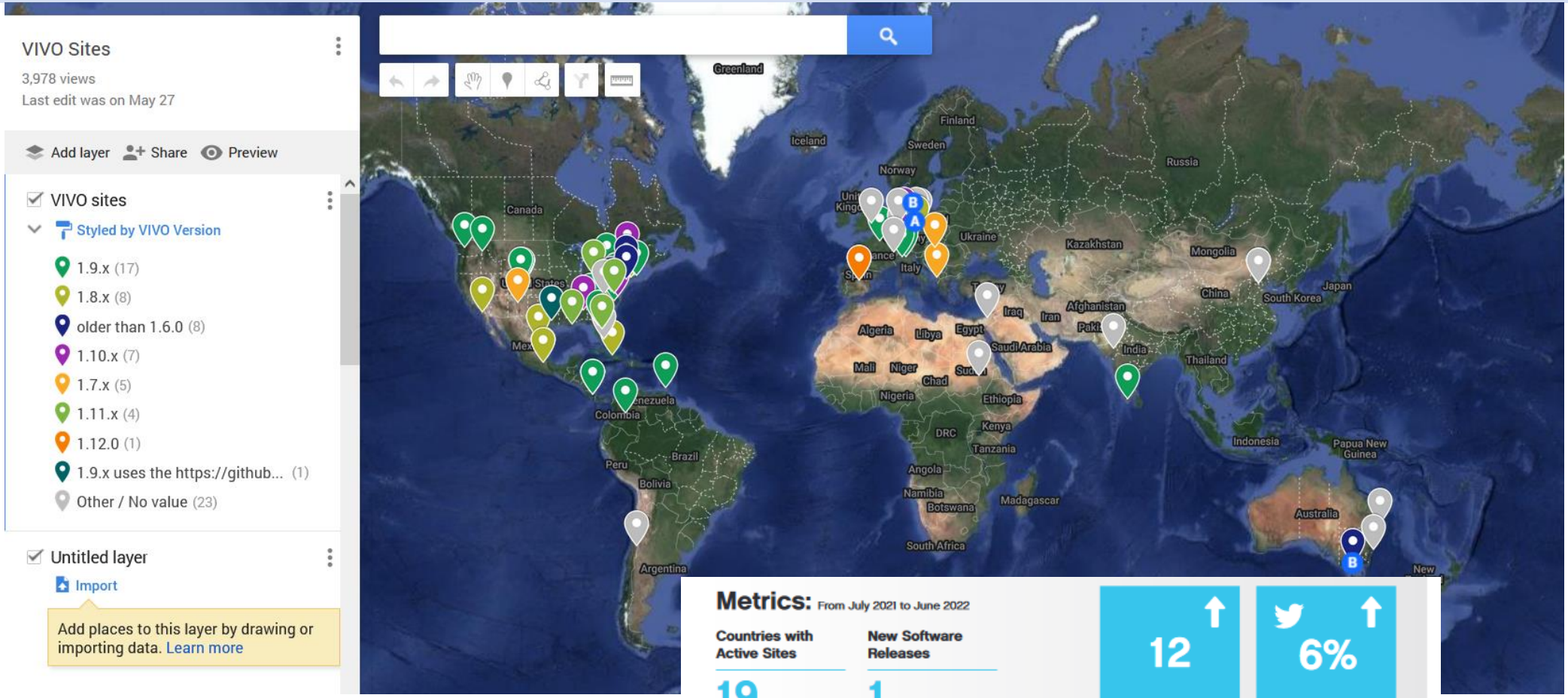
Groups created by the community to support initiatives but without limited time

Task Forces

Groups created by the community with a specific and finite objective in time

VIVO Sites and numbers

Access the interactive VIVO map and the annual report!



+60 institutions and agencies

+20 countries implementing VIVO

Metrics: From July 2021 to June 2022

Countries with Active Sites	New Software Releases
19	1
Active Sites	Development Sprints
4 Global Events	4

12 Newly Registered Sites

6% Twitter Followers — Percentage increase since last year

Members 3 Platinum | 4 Gold | 3 Silver | 7 Bronze | 1 Supporter | 1 Contributor

VIVO Events

2021-23 Community Events

- VIVO 2021 conference (Virtual) – 252 attendants, most international, from 32 countries worldwide
- North American User Group Meeting
- Launch of the Spanish-speaking User Group Meeting with more than 600 attendants
- VIVO track at the CRIS2022 (15th International Conference on Current Research Information Systems, Dubrovkin, Croatia).
- German VIVO-Workshop, June 2022
- 1st OECD MARIAD Webinar: Data Information Models for Scientific Research, June 2022
- VIVO Talks: a webinar series at the Berlin University Alliance

VIVO Roadmap

Software evolution

- New versions are released periodically with relevant improvements such as multilanguage, accessibility and gender perspective, performance improvements, security, etc.
- VIVO core refactoring

Usability and Utility

- Dynamic API

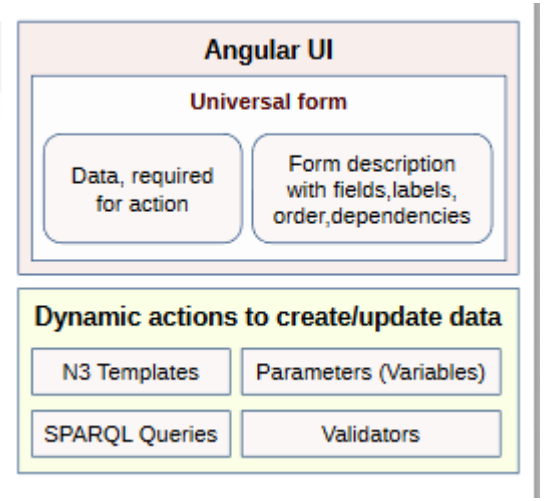
Interoperability

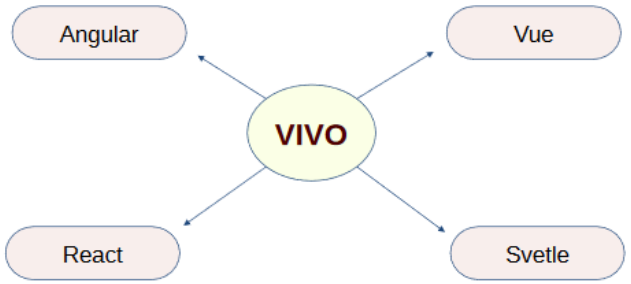
- CERIF2VIVO mapping - Collaboration with EuroCris to align CERIF model to VIVO ontology. (ongoing) https://wiki.lyrasis.org/display/VIVO/Ontology+Interest+Group
- Integrating Dspace and VIVO: (ongoing) https://wiki.lyrasis.org/display/VIVO/DSpace-VIVO+integration+task+force

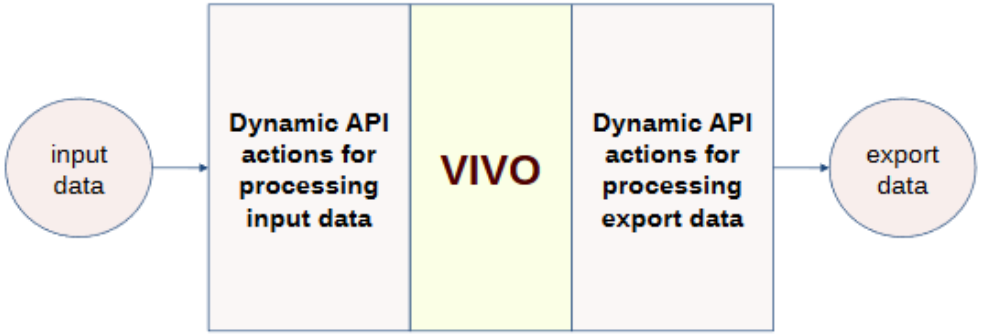
VIVO Roadmap. Dynamic API

Goal: Dynamic API would lead to decoupling frontend and backend, would enable easier customization of VIVO.

- Dynamic custom entry forms
- New web interfaces
- Better integration with external application.

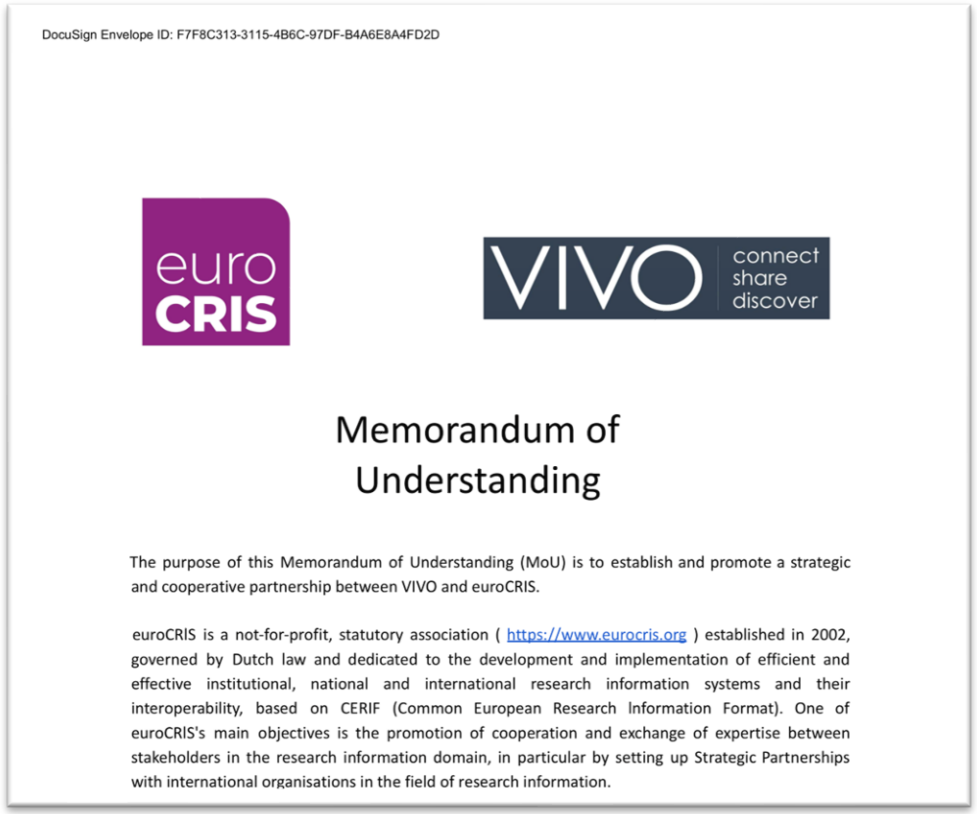






Source: https://zenodo.org/record/6652252#.YrAjguxBxPY

VIVO Roadmap. CERIF2VIVO mapping


DocuSign Envelope ID: F7F8C313-3115-4B6C-97DF-B4A6E8A4FD2D

euro CRIS

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Memorandum of Understanding

The purpose of this Memorandum of Understanding (MoU) is to establish and promote a strategic and cooperative partnership between VIVO and euroCRIS.

euroCRIS is a not-for-profit, statutory association (https://www.eurocris.org) established in 2002, governed by Dutch law and dedicated to the development and implementation of efficient and effective institutional, national and international research information systems and their interoperability, based on CERIF (Common European Research Information Format). One of euroCRIS's main objectives is the promotion of cooperation and exchange of expertise between stakeholders in the research information domain, in particular by setting up Strategic Partnerships with international organisations in the field of research information.

MOU with EuroCRIS, Jul 2021

Takes advantage of mutual interests

Goals:

- Promote the use of VIVO in Europe
- Collaborate on interoperability: Align euroCRIS CERIF framework and VIVO ontology
- Communications between the communities
- Attend mutual conferences and events

https://eurocris.org/news/eurocris-and-vivo-sign-mou

VIVO Roadmap. CERIF2VIVO mapping

Benefits of the mapping:

- ✓ Interoperability between VIVO platforms and CERIF-compatible CRIS systems
- ✓ Knowledge transfer
- ✓ Improvement of CERIF model and VIVO ontology by analyzing the other side
- ✓ Extensions of the data models
- ✓ Addition of descriptions and annotations
- ✓ Machine-executable mapping for various purposes and in various notations, for example, for a CERIF-compliant data export from VIVO

Project information: https://dspacecris.eurocris.org/bitstream/11366/1972/4/DIvanovic_CERIF2VIVO-mapping_CRIS2022_slides.pdf

VIVO Roadmap. Integrating Dspace and VIVO

Goal: consider using VIVO as a frontend for one or multiple DSpace instances at the institution

- A new presentation of DSpace items and semantic web aspect to existing DSpace repositories
- DSpace-VIVO migration assigns a unique ID to the researchers and subjects (keywords)
- The 'Capability Map' allows an expertise mapping across data sources

Project information:
https://github.com/vivo-community/DSpace-VIVO
https://wiki.lyrasis.org/display/VIVO/DSpace-VIVO+Technical+Documentation

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The VIVO software

The VIVO software

VIVO is an example of an application built entirely with Semantic Web technologies promoted by the World Wide Web Consortium.

- Implements an Ontology based on standard international ontologies
- Stores data as RDF expressed in terms of vocabularies called ontologies
- provides persistent URIs for data.
- Represents the expertise of people engaged in the creation, transmission, and preservation of knowledge and creative works.
- Contains FAIR data, complying with Linked Open Data Standards

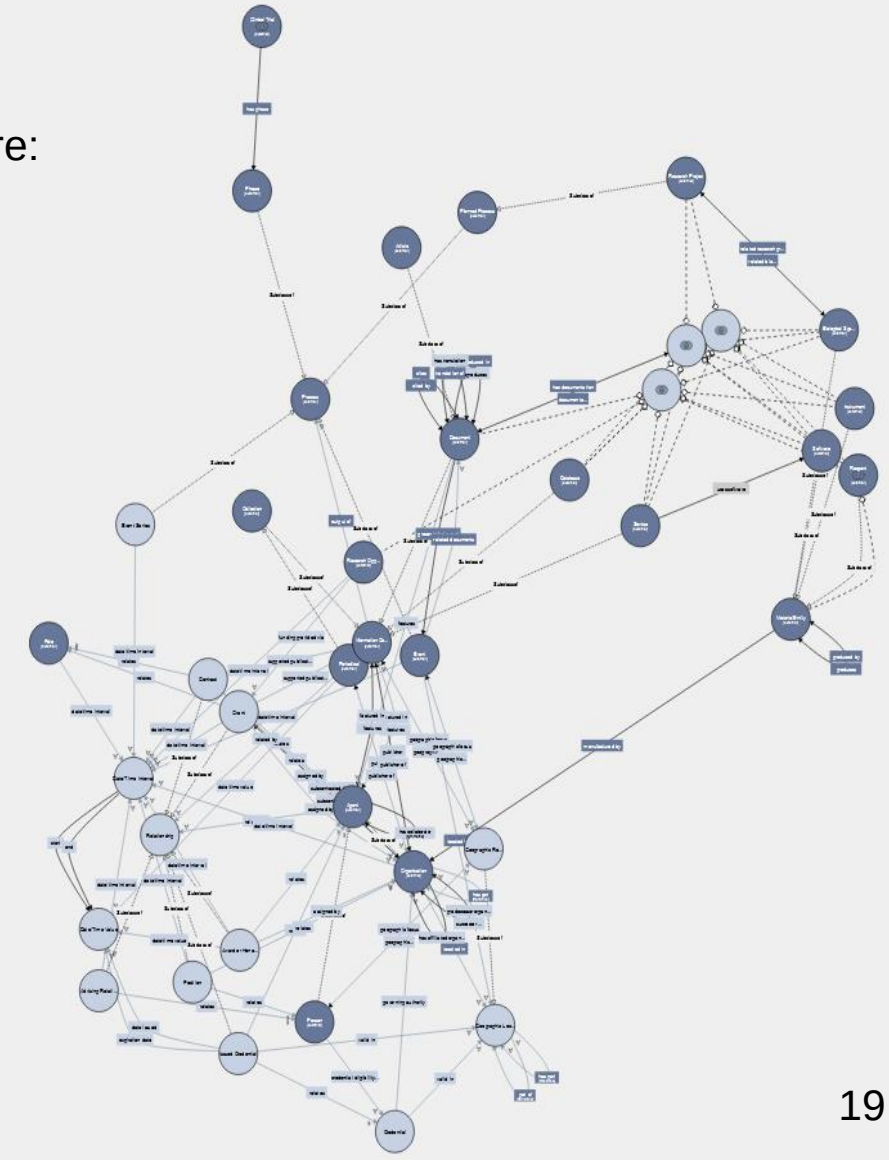
- **System requirements**: VIVO may be hosted on one or more physical servers, on virtual servers, or in the cloud. Components:
  - Recommended installation (*): 4 cores x64 (min 2), 32 Gb RAM (min 2GB), 500 GB SDD (min 100 GB HDD)
  - OS Linux
  - TomCat Web application
  - MySQL database (with the default Jena SDB triple store)
  - Apache Solr search index.

(*) SIGMAAIE recommendations for a standard VIVO installation

Ontologies Used in the VIVO Ontology

The VIVO Ontology leverages the following ontologies in a unified, semantic structure:

- eagle-i Resource Ontology (ERO) – http://www.obofoundry.org/ontology/ero.html
- Basic Formal Ontology (**BFO**) – http://www.obofoundry.org/ontology/bfo.html
- Bibliographic Ontology (**BIBO**) – http://bibliontology.com/
- **Event** Ontology – http://motools.sourceforge.net/event/event.html
- Friend of a Friend (**FOAF**) – http://www.foaf-project.org/
- Gene Ontology (GO) – http://obofoundry.org/ontology/go.html
- Geopolitical.owl, from the U.N. Food and Agriculture Organization
- Information Artifact Ontology (**IAO**) – http://www.obofoundry.org/ontology/iao.html
- Ontology for Biomedical Investigations (OBI) – http://www.obofoundry.org/ontology/obi.html
- Ontology of Clinical Research (OCRe) – http://code.google.com/p/ontology-of-clinical-research/
- Relations Ontology (RO) – http://www.obofoundry.org/ontology/ro.html
- Software Ontology (SWO) – http://www.obofoundry.org/ontology/swo.html
- **SKOS** (Simple Knowledge Organization System) – http://www.w3.org/2004/02/skos/
- **vCard** – http://www.w3.org/TR/vcard-rdf/
- SPAR ontologies, including FABIO, CiTO, and C4O: https://purl.org/spar/fabio



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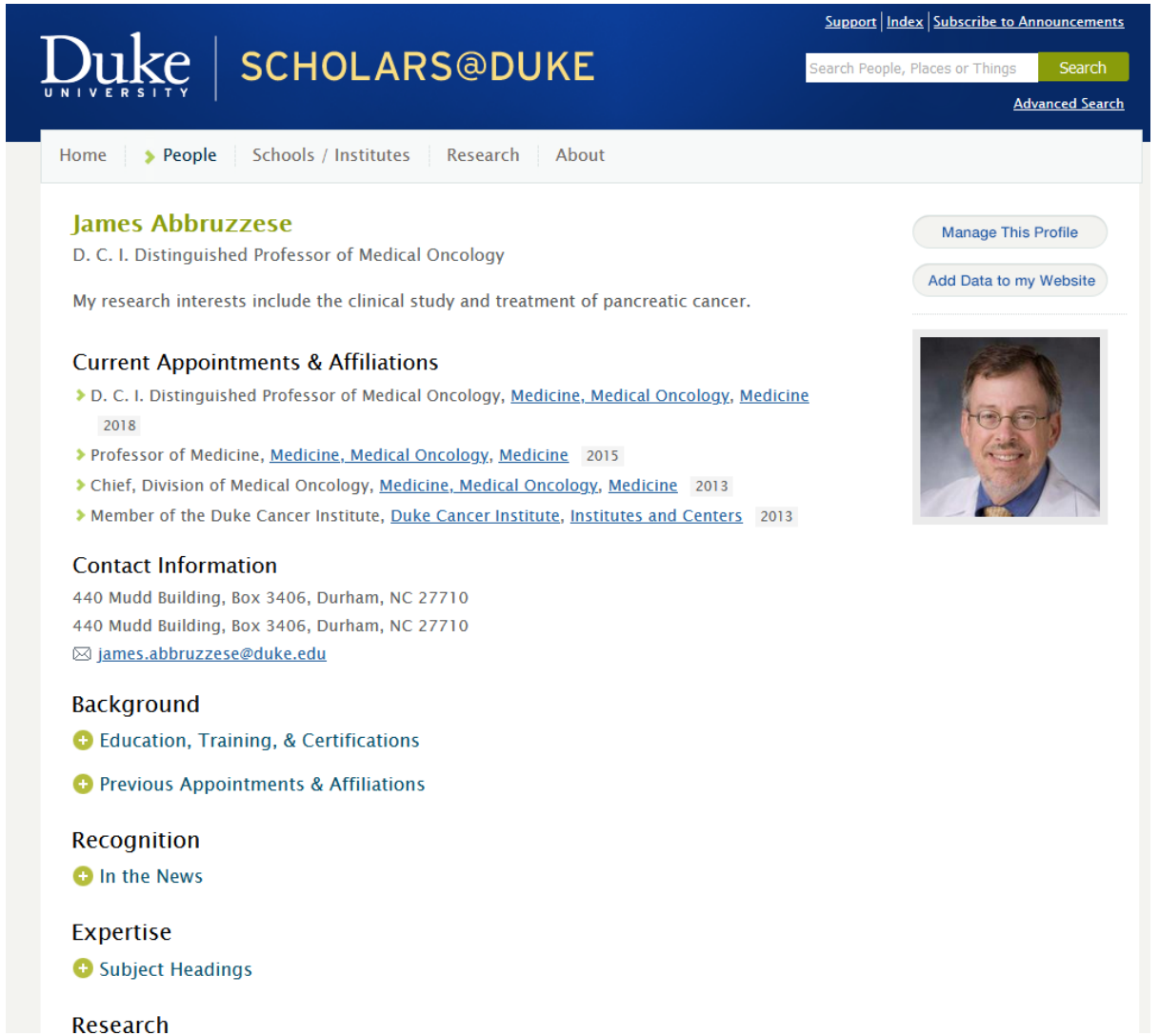
VIVO use cases

Some examples

https://vivo.weill.cornell.edu/



https://scholars.duke.edu/

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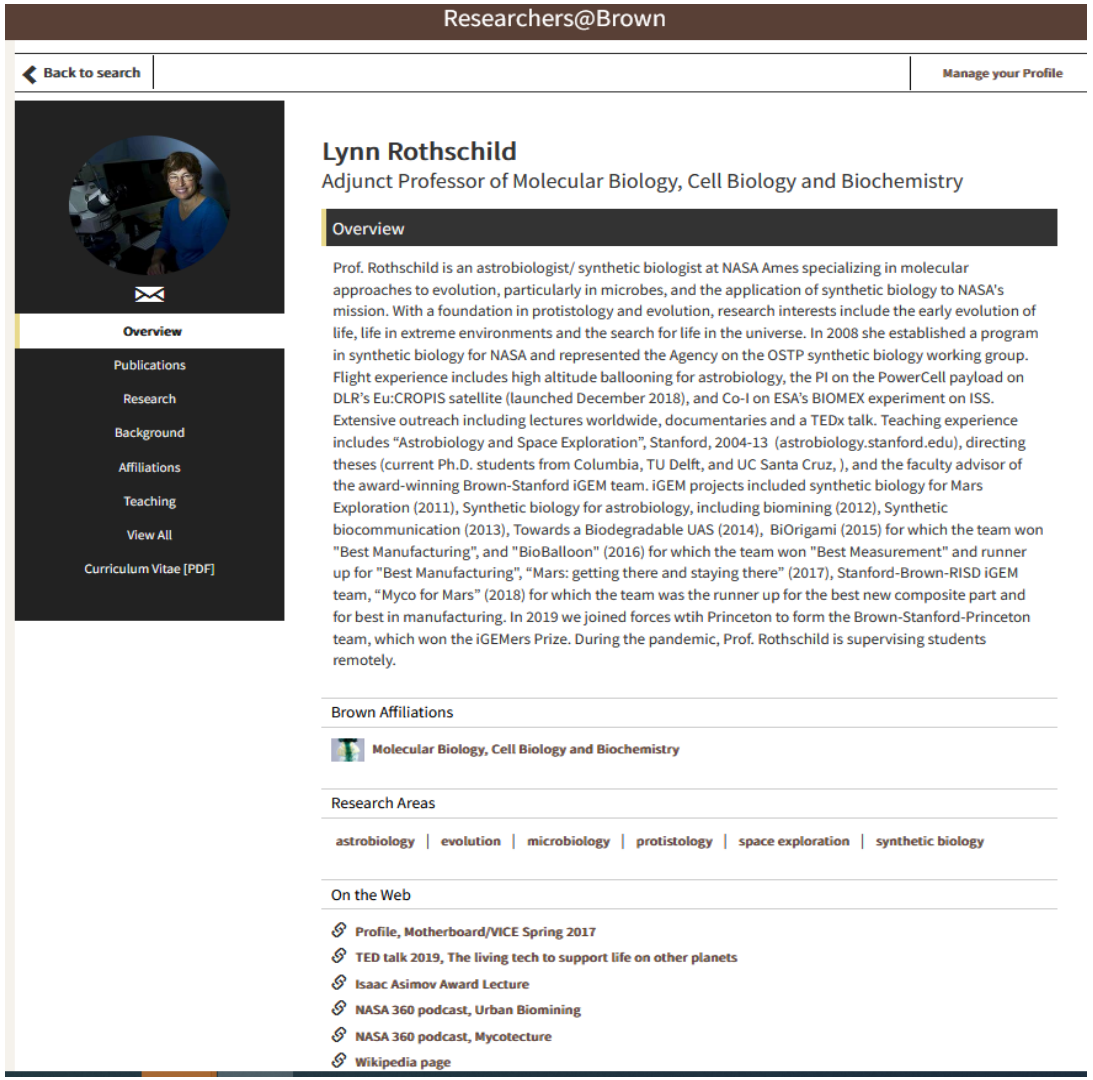
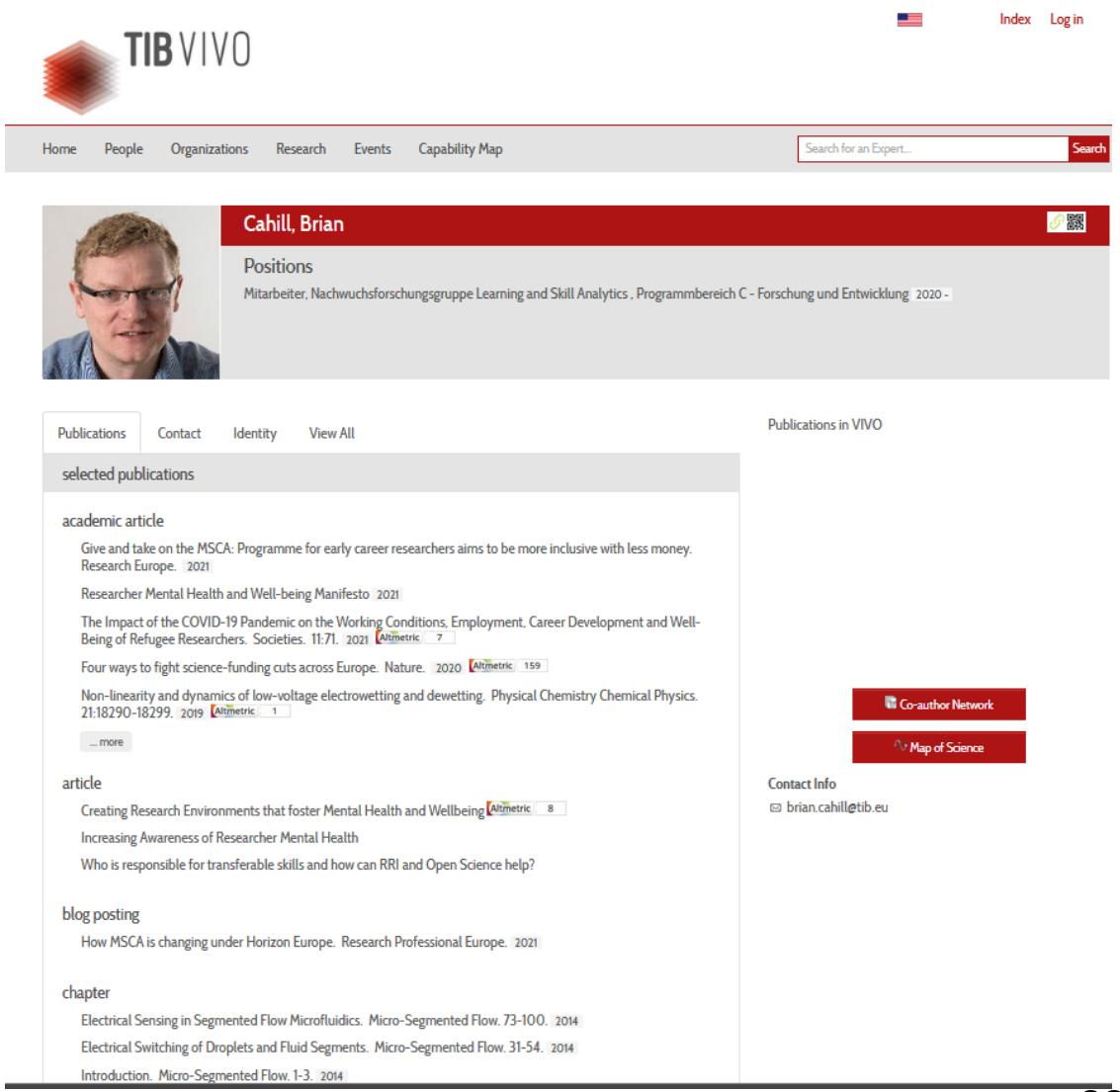
Some examples



https://vivo.brown.edu/



https://vivo.tib.eu/fis/

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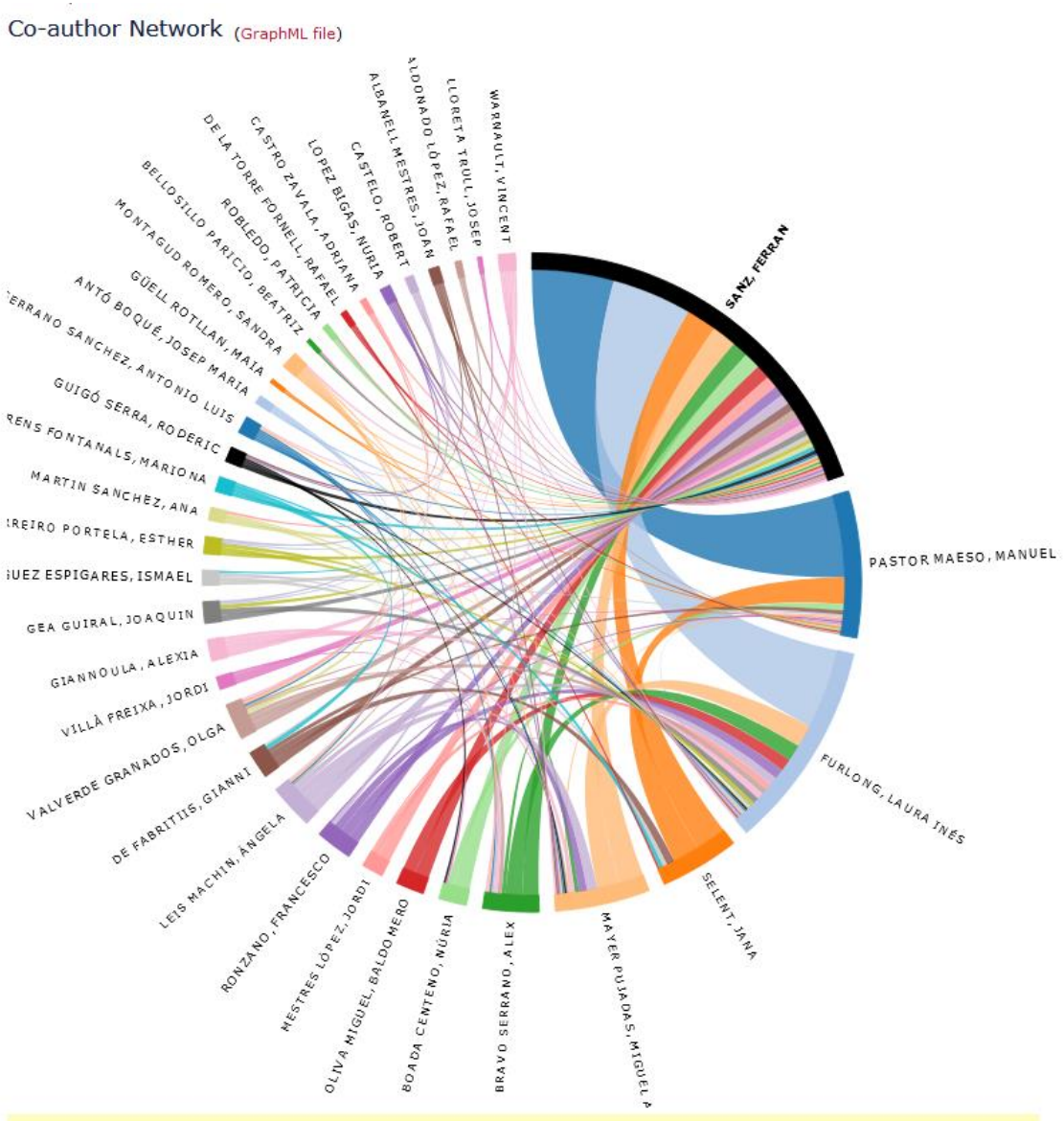
VIVO as a network

To boost collaborations



211 Publications
from **1975 - 2021** (256 total)
(.CSV File)

42 co-authors
from **1994 - 2021** (44 total)
(.CSV File)

Tables

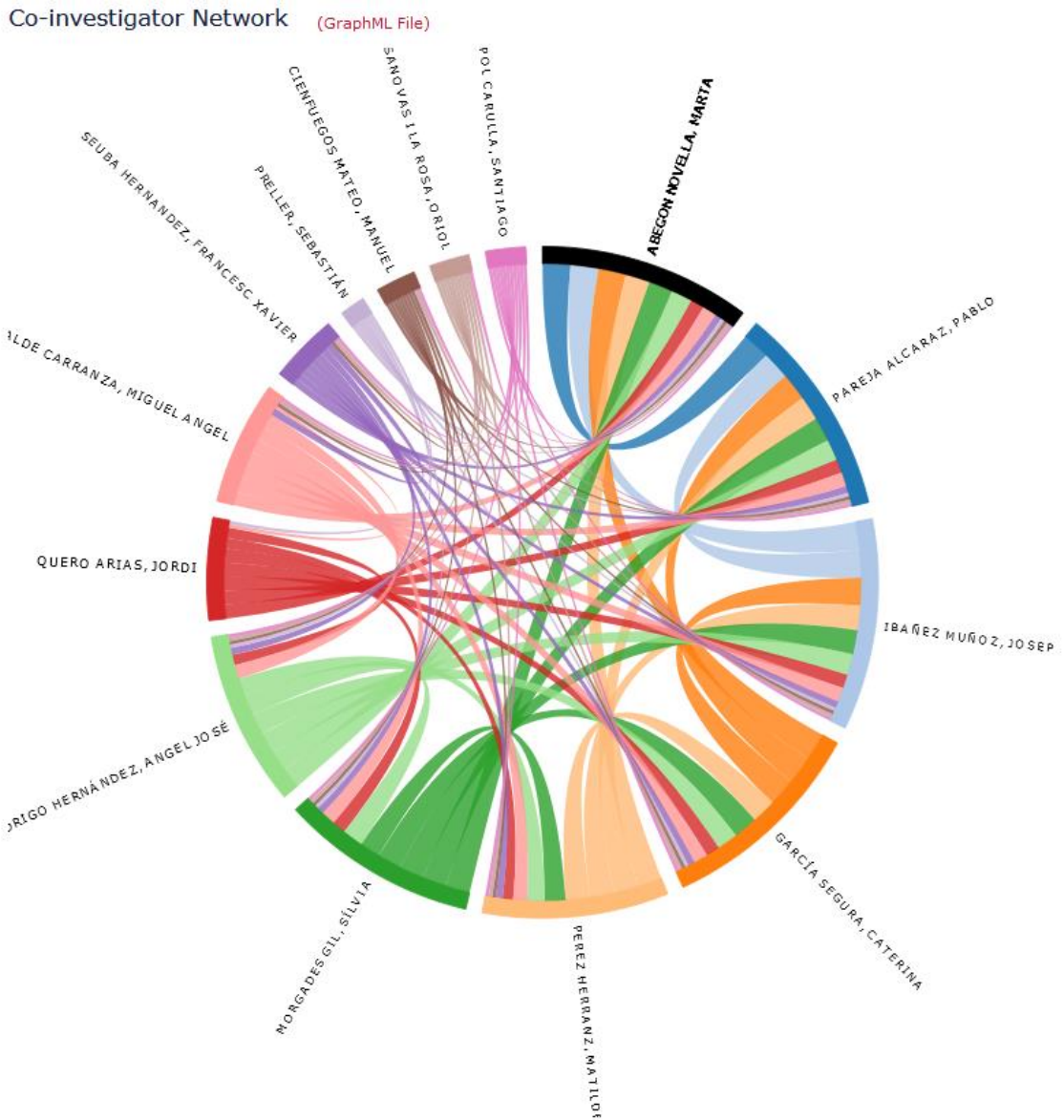
Publications per year (.CSV File)

Year	Publications
1975	1
1977	2
1978	2
1979	1
1982	2
1983	4
1984	2
1986	4
1987	1
1988	8
1989	6
1990	5
1991	6
1992	4
1993	6
1994	8
1995	5
1996	8
1997	6
1998	4
1999	5

Co-authors (.CSV File)

Author	Publications with
PASTOR MAESO, MANUEL	40
FURLONG, LAURA INÉS	39
SELENT, JANA	15
MAYER PUJADAS, MIGUEL ANGEL	12
BRAVO SERRANO, ALEX	8
BOADA CENTENO, NÚRIA	8
OLIVA MIGUEL, BALDOMERO	7
MESTRES LÓPEZ, JORDI	6
RONZANO, FRANCESCO	5
LEIS MACHIN, ÁNGELA	5
VALVERDE GRANADOS, OLGA	4
DE FABRITIIS, GIANNI	4
VILLÀ FREIXA, JORDI	4
GEA GUIRAL, JOAQUIN	3
GIANNOULA, ALEXIA	3
GUIGÓ SERRA, RODERIC	2
BARREIRO PORTELA, ESTHER	2
RODRIGUEZ ESPIGARES, ISMAEL	2

VIVO as a network



To boost collaborations

8 grants
from **2009 through 2021**
(.CSV File)

13 co-investigators
from 2009 through 2021
(.CSV File)

Tables

The information in the following tables is for all years.

Grants per year (.CSV File)

Year	Grants
2009	1
2012	2
2014	1
2015	1
2016	1
2017	1
2018	1

Co-investigator(s) (.CSV File)

Investigator	Grants with
PAREJA ALCARAZ, PABLO	8
IBAÑEZ MUÑOZ, JOSEP	8
GARCÍA SEGURA, CATERINA	8
PEREZ HERRANZ, MATILDE	7
MORGADES GIL, SÍLVIA	7
RODRIGO HERNÁNDEZ, ANGEL JOSÉ	6
QUERO ARIAS, JORDI	4
ELIZALDE CARRANZA, MIGUEL ANGEL	4
SEUBA HERNANDEZ, FRANCESC XAVIER	2
PRELLER, SEBASTIÁN	1
CIENFUEGOS MATEO, MANUEL	1
CASANOVAS I LA ROSA, ORIOL	1
RIPOL CARULLA, SANTIAGO	1

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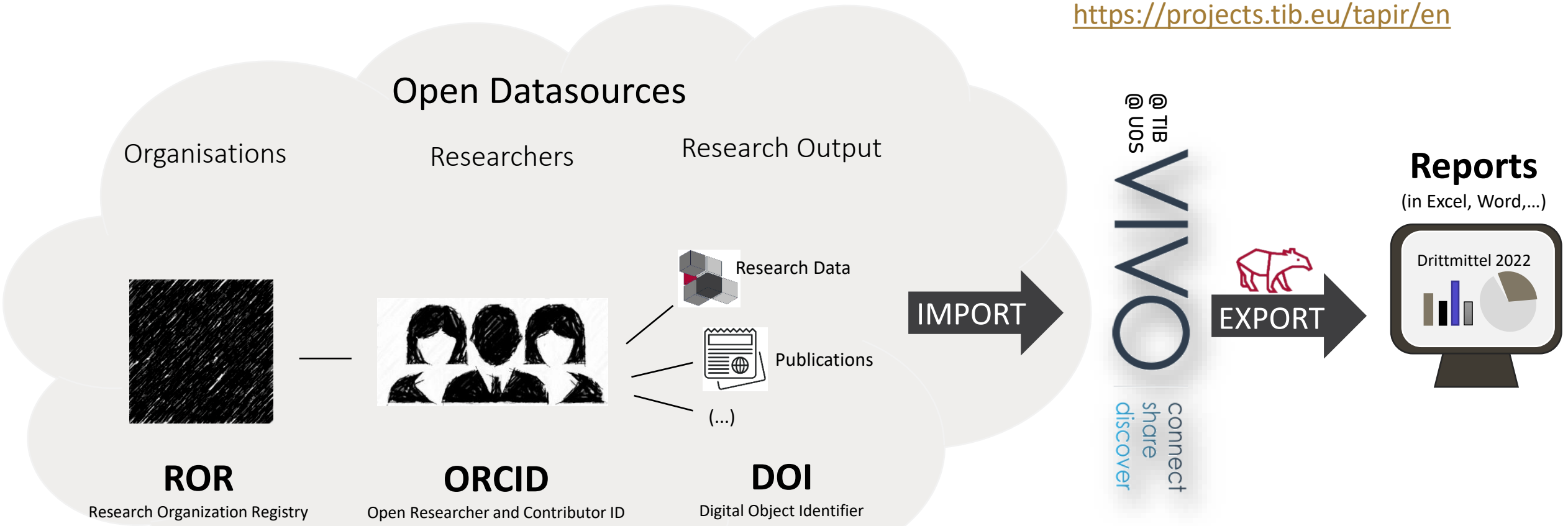
Innovation in the VIVO Community

VIVO for Open Science

https://projects.tib.eu/tapir/en



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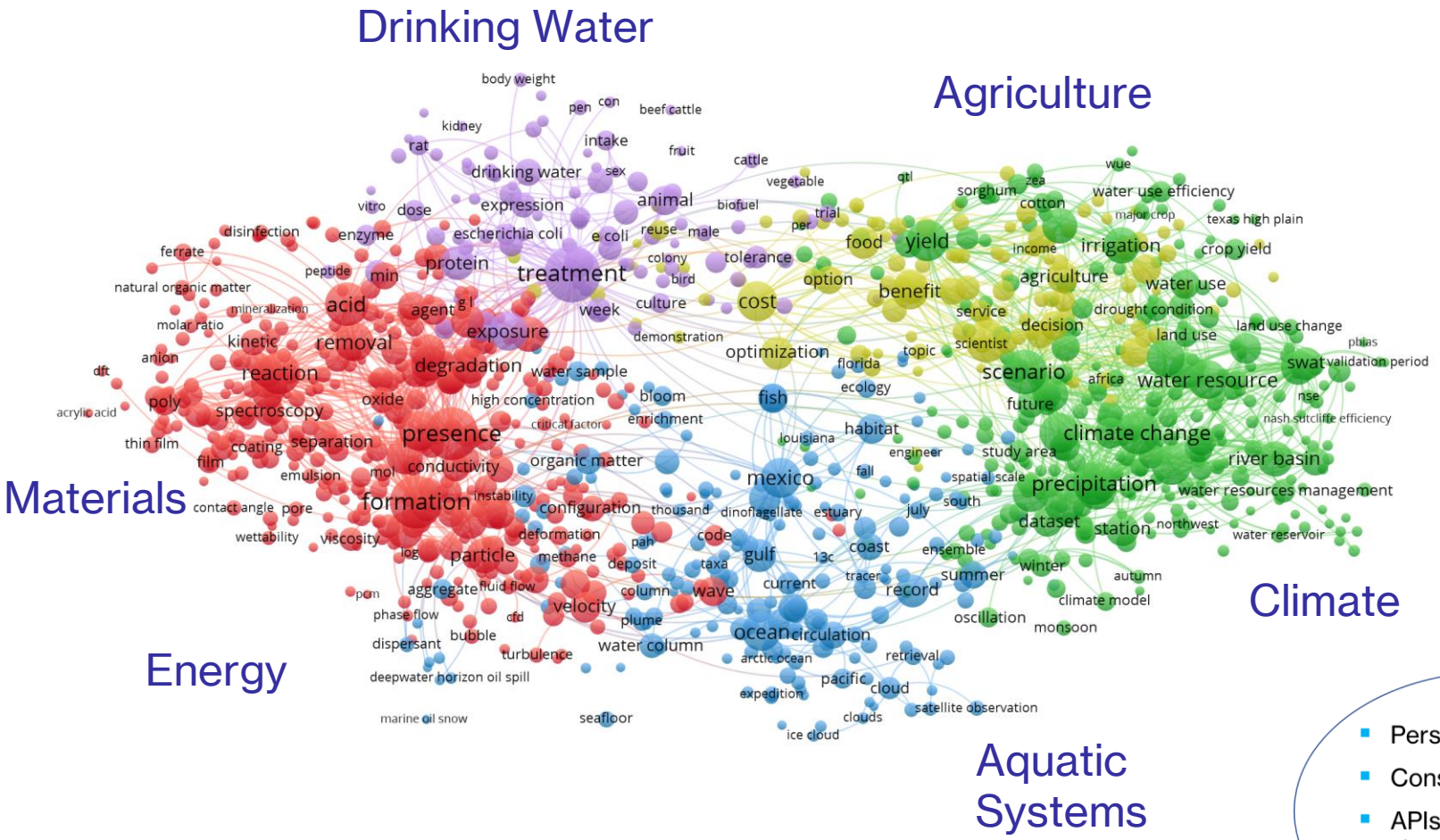
Research intelligence as emerging use case



Water-Related Research at Texas A&M

Research Intelligence: Establish, execute, and evaluate institutional research strategy & evaluation

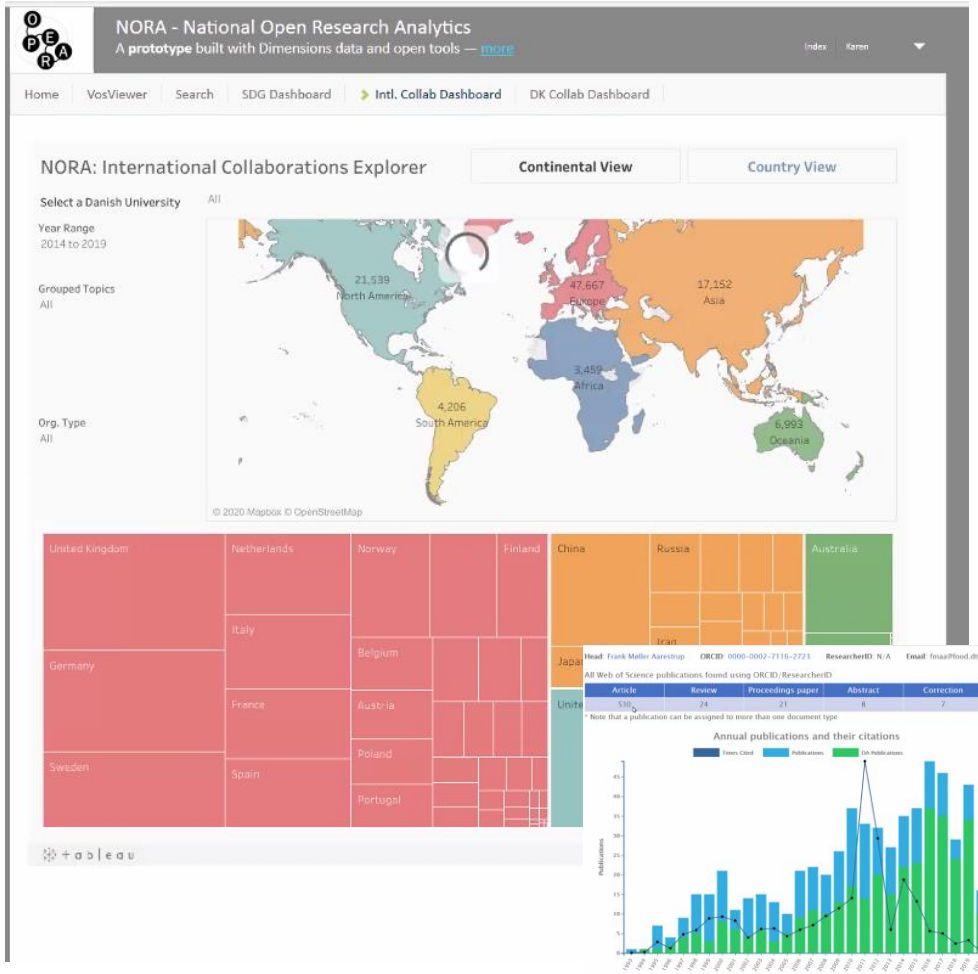
- Principle Investigators
- College and Department Program Reviews
- Vice President of Research

Takes advantage of linked data!

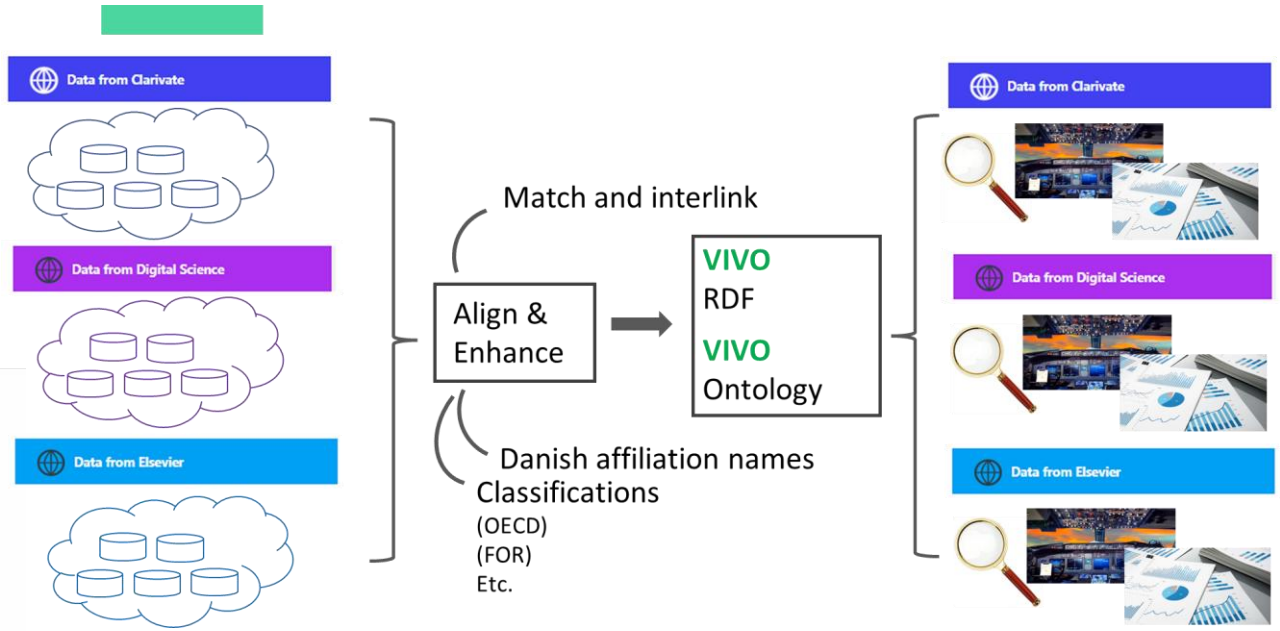
- Persistent Identifiers
- Consistent Ontology
- APIs for automated data sharing
- Data Governance

→ VIVO as Semantic System → *Emerging Knowledge Graph*

Research intelligence as emerging use case



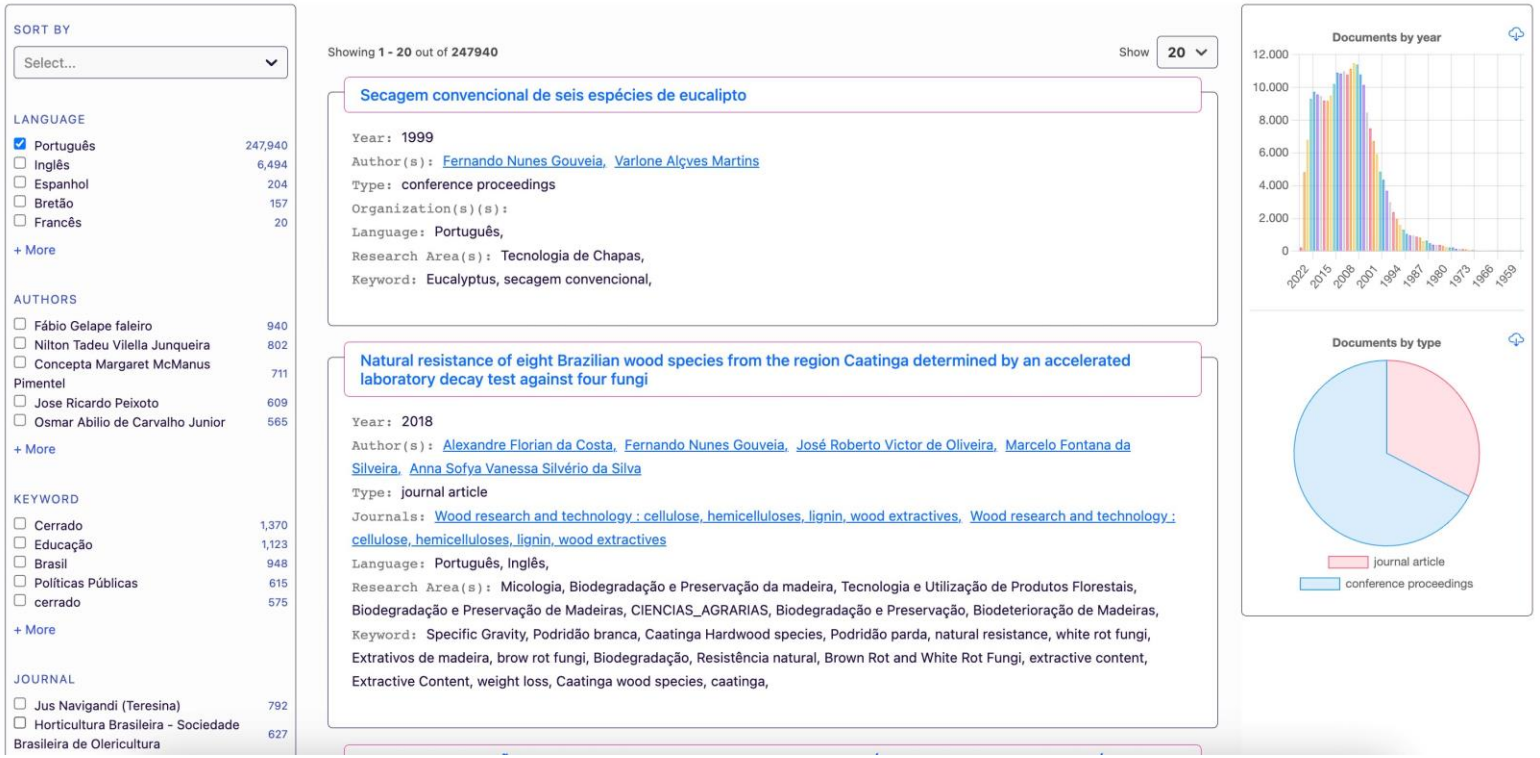
Nora project from DTU – Denmark
Using the VIVO ontology to find research insights
(from Global datasources & Danish CRIS)

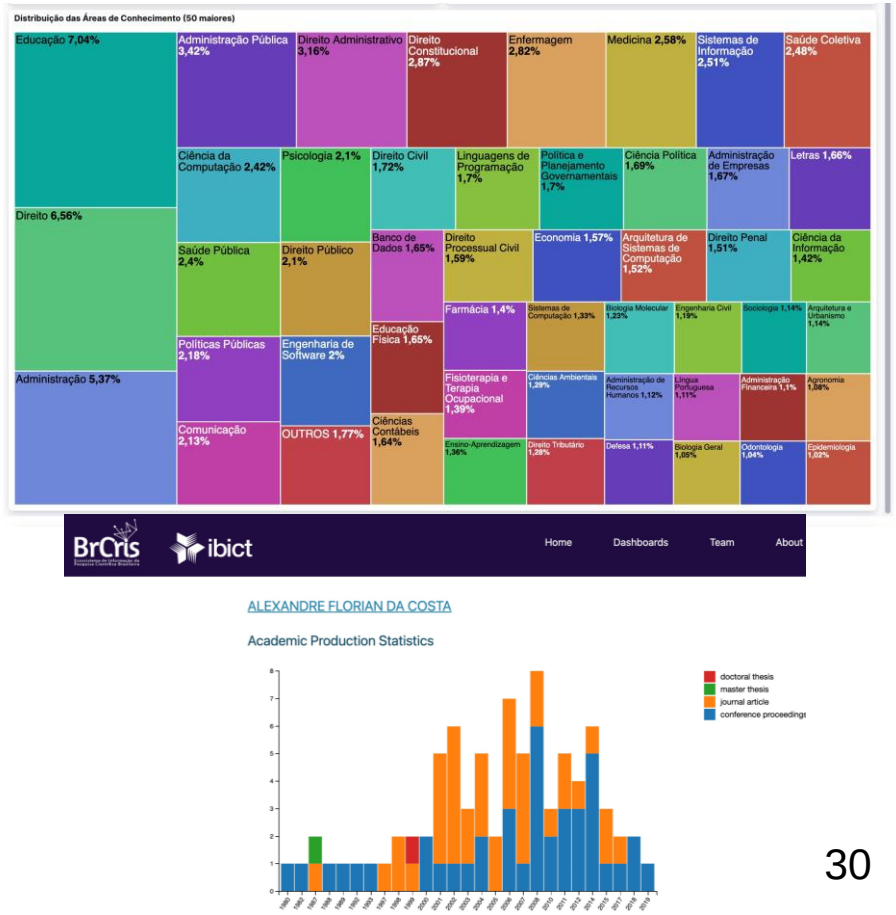


NORA, National Open Research Analytics, is a national initiative to enable robust and open insights and analytics of Danish research. NORA is focused on national level insights, and thus NORA supplements rather than replaces existing institutional systems, offering deep and detailed insights at various levels inside the institution, and existing global databases and research intelligence systems, offering insights and advanced analytics at the global level.

National/regional Research Portals. BrCRIS

- Information System on the Ecosystem of the Brazilian Scientific Research with VIVO. Aggregation of different national and international data bases (Lattes Platform, LA Referencia Platform(*) , etc. (exports to VIVO, APIS and visualizations).
- Entities and relationships recommended by the OpenAIRE Guidelines for CRIS Managers (CERIF-based)
- Using technologies such as Elastisearch and Kibana for search and visualisalization over VIVO instance.





(*) Latin American open access science repository network.

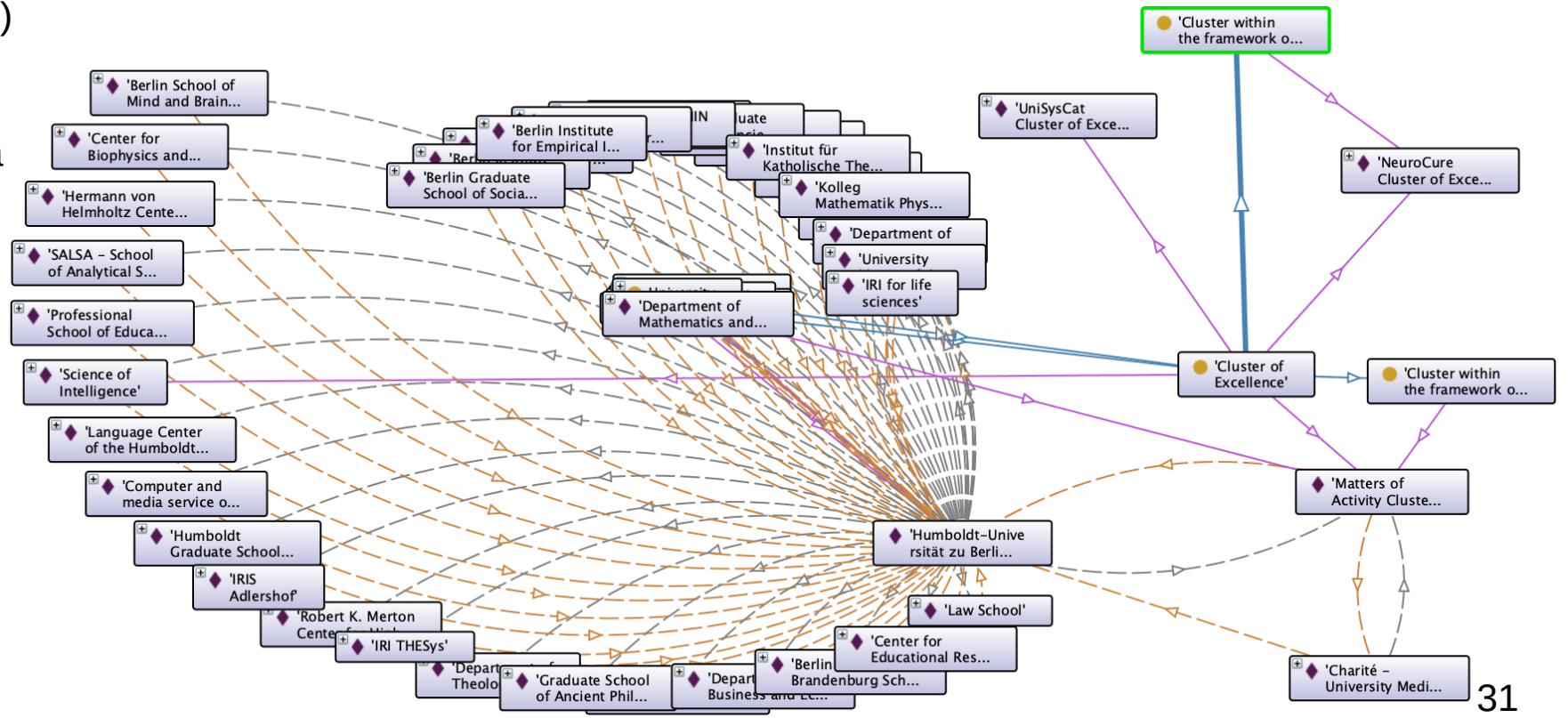
National/regional Research Portals. BUA platform

- ☑ Connect researchers to their work beyond boundaries
- ☑ Improve the visibility and discoverability of expertise
- ☑ Facilitate new research collaborations across disciplines

- Research information Platform for the Berlin University Alliance (BUA)
- platform for 3 German universities + Charité (large university Hospital) with VIVO
- Within the framework of Berlin University Alliance, a platform for a structured and transparent presentation of research information
- Data linking: Semantic Web technology of the "VIVO" software

Start: May 2021

Runtime: Dec. 2023



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Conclusions

Conclusions (I)

- VIVO has a great community behind, has strengthened its governance and is working on a roadmap that will allow it to evolve in line with new trends, focused on open Science and data sharing, reusing, etc.

- Working on fostering partnerships with relevant organizations with which important collaborations can be made.

- Focus on the interoperability though projects like the mapping between the interoperability standard CERIF with the VIVO ontology; and the integration with Dspace .

- Relevant ongoing projects and product evolution led by a great group of developers, coordinated by a technical leader.

- Because VIVO is a semantic system with linked, open data, it helps support the creation of emerging knowledge graphs, in this way, there are innovative projects and success use cases examples in the community that offer VIVO-based solutions focused on research intelligence and knowledge graphs.

- There is a clear trend to use VIVO as a research portal at regional or national level, as an aggregator of data from different RIM/CRIS systems, to provide relevant information to governments, for decision making or policy definition.

Conclusions (II)

- VIVO offers versatility and adaptability of the software and advantages given by an ontology based on international standards that provides linked open data, to discover, use and share information.

- A system such as VIVO allows the organization to own its data and at the same time make it accessible (FAIR data).

- These systems support the transparent aggregation, curation, and utilization of heterogenous data about institutional research activities that can be used to promote researcher identity and reputation, reporting and compliance, or research intelligence.

- Enables improved science assessment and evaluation and can be esaily aligned with open science standards and policies.

- A RIM/CRIS system such VIVO, can be useful for the country's policies for research and innovation, mapping investment in Science & Technology versus Innovation results, creating a fairer Science evaluation system, in view of Open Science precepts and connecting the entire scientific ecosystem, allowing quick visualisation of complex variables, generating information for decision-makers, among others.

Interested in learning more?

Get involved in the VIVO community!

- Visit vivoweb.org
- Read more at wiki.duraspace.org
- Follow @vivocollab on Twitter
- Join VIVO mailing lists
- Email anna.guillaumet@sigmaaie.org or beherbert@tamu.edu

Thank you very much!