

eResearch: librarians pushing technology to perform

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IUG Directors' meeting

Port Elizabeth 12 November 2008





Slide 2

Changes in Traditional Research

Visualisation

Cyber infrastructure

Global Collaboration

Personalisation

Big science

e-Research

Previously impossible research

VRE

Opportunities

New technologies

South Africa

Threats

HPC

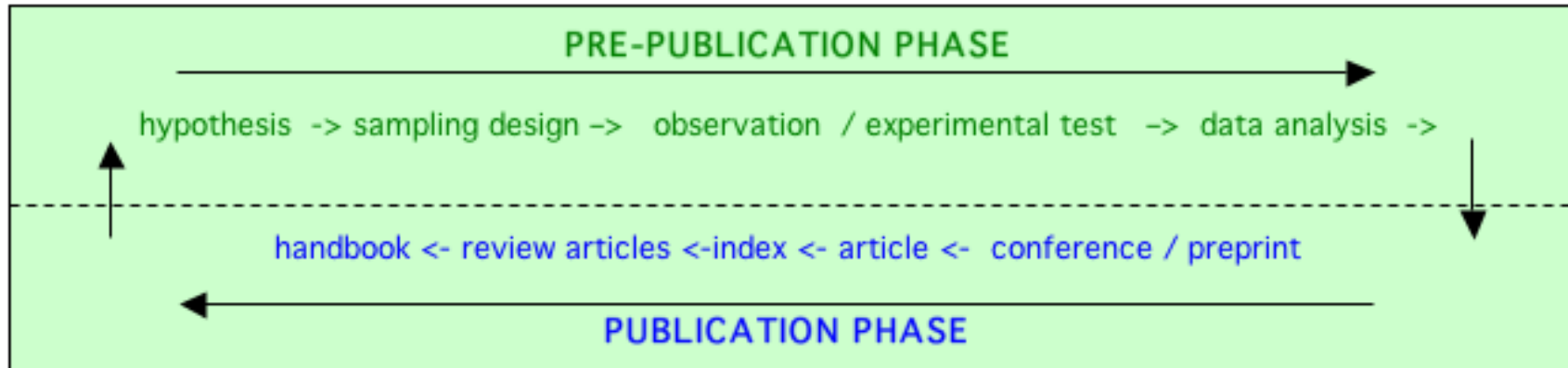
International

Multidisciplinary

Definitions



Research is changing



(Gold, 2007, Part 1)

Today much of the work of scientists is **internet-based**. From their desks scientists access special hardware, software, data and applications as parts of distributed systems. Typically access to them has to be made explicit by keying in specific data. **Cooperation** with other scientists (e.g. the **exchange of interim or final results** of research for annotation and further use) typically takes place via the internet. (Osswald, 2007: 517)

Even if publications are still the currency of tenure, data is the currency of science, (Gold, 2007) ... !

Ready for eResearch?

- My research involves **working with researchers** from other organisations in South Africa/ Africa and/or overseas ...
- Data and/or **equipment** that would be useful to me are located **elsewhere** ...
- I have data and/or equipment that other researchers would like to access ...
- I need to send/receive large quantities of data (e.g. audio, video, datasets) ...
- I am aware of international research initiatives in my area and would like to participate in them ...

Ready for eResearch?

- I do not **collaborate with other researchers** in other organisations but I would like to in future
- I organise / attend meetings regularly with other researchers
- I have data and/or equipment that other researchers would like to access
- I use software programs to analyse data - it is very complex / takes a long time but produces a **graphic** that I can interpret
- I often email/phone colleagues elsewhere in South Africa/ Africa and overseas to discuss research projects and common research interests

eResearch: challenges for the librarian

- Most librarians are much **less familiar with the data-generating research phases** of the scientific research cycle than with post-research
- **Data science** and data management are an **awkward fit** with the **text**-oriented constructs and systems that still dominate library relationships with science communication and publishing
- **Becoming literate** in cyberinfrastructure means understanding cyberinfrastructure, eResearch, collaboratories, collaboration science, computational and grid science, data curation, the Semantic Web, open data, data archiving, digital preservation, and data management, and how they relate to each other
- **Phases** of reporting, communication and publication are **less distinct**
- When used in discussions of eResearch, a **vocabulary** familiar to librarians (archival, curation, stewardship, provenance) takes on new or specialized meaning ... major cause of **confusion**

- **What is currently the same**

- Having to adapt to change
- Researchers currently still regard libraries as trusted service providers ... but for how long?

- **What's Different**

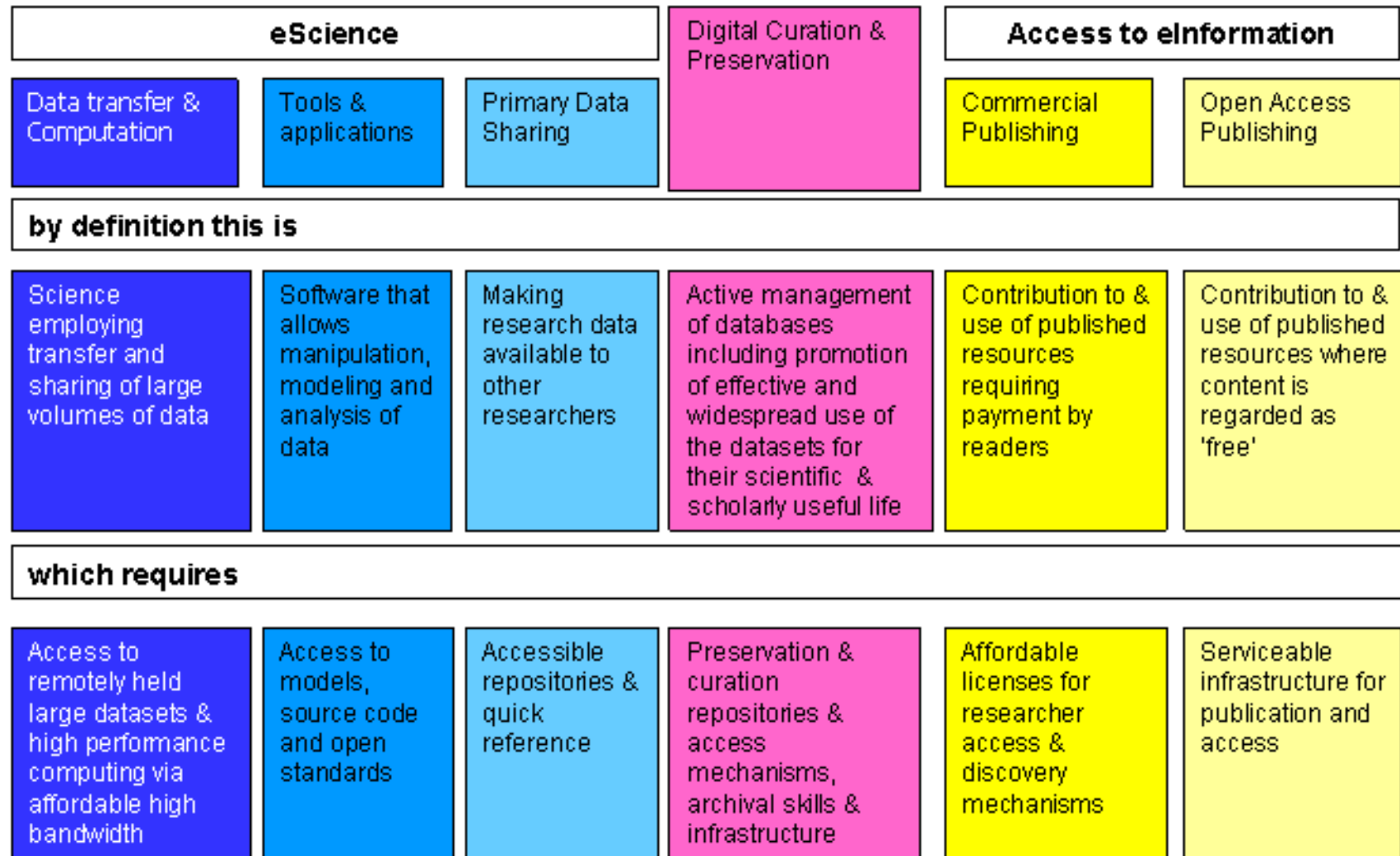
- Collaboration ... science has to become big and multi-disciplinary to solve the really big challenges
- Research often relies on visualisation
- Researchers need partners in research rather than just suppliers and support staff
- Expanded skill sets – need to learn to do different tasks

What is eResearch?

- eResearch is research done **faster**, to
- a **better quality**, or
- by **different methods**, using
- **advanced digital tools** and
- services that enable **diverse research expertise** to be
- assembled in **global teams** focused on
- **very specific research problems**

Hine, 2008, http://www.mcs.vuw.ac.nz/twiki/pub/EResearch/Resources/symposium_hine.pdf

Components of eResearch



Researcher Requires: Perpetual access, Curation, Training, Marketing

Supplier must ensure: Security - Access, Authorization, Authentication



Examples of eResearch: Serious Disease Genes Revealed

- Wellcome Trust Case Control Consortium
- 50 research groups
- 200 scientists
- DNA from 17,000 patients
- 15,000 polymorphic markers
- Learned more in 12 months than last 15 years

<http://www.mcs.vuw.ac.nz/ereseach>



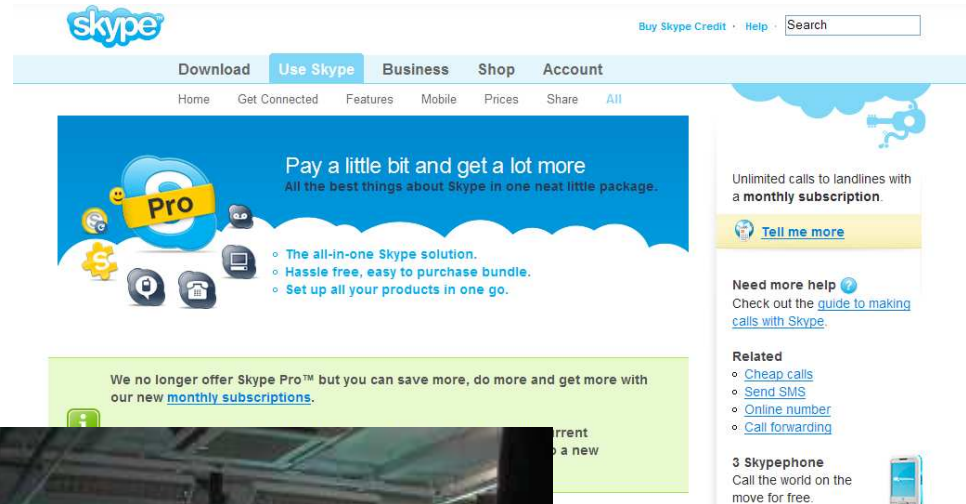
Functional MRI (fMRI) Data Centre

- Online repository of neuroimaging data
- Typical study comprises:
 - 3 groups
 - 20 subjects/group
 - 5 runs per subject
 - 300 volumes per run
 - 90,000 volumes,
 - 60GB raw data
 - 1.2 million files processed
- 100s of such studies

Collaboration, co-ordination & communication



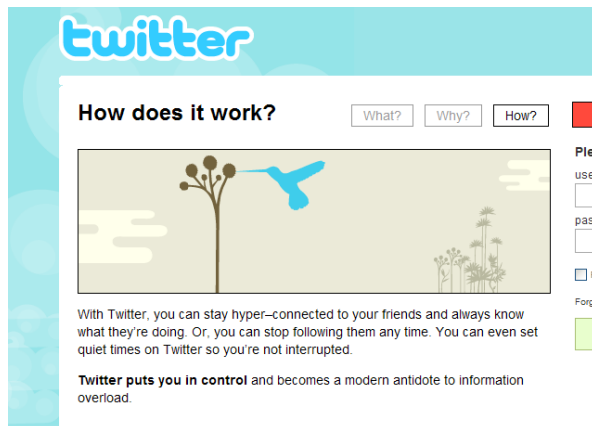
Desktop video-conferencing



Skype



Video-conferencing



Twitter: 21st century telegraph

Visualisation



<http://www.mcs.vuw.ac.nz/EResearch/Symposium>

Working in multidisciplinary teams



Expect: jargon confusion, language barriers, cultural barriers, etc



Centre for High Performance Computing – Rosebank Cape Town

enabling science through cyber technology

CHPC

CENTRE FOR HIGH
PERFORMANCE C



- The first phase of the computational procurement consists of High-Speed e1350 Linux computer cluster with 160 nodes:
- Each node is equipped with two dual-core AMD Opteron 2.6GHz processors and 16GB of random access memory
- Shared file system from the SAN accessed by the nodes over the infiniband 10 GB cluster interconnecting Clearspeed Floating Point Accelerator
- An aggregate of 640 processing power at approximately **2.5 Terraflops** per second
- In addition to local hard disks, all nodes have access to a shared storage system with a capacity of 94TB using General Parallel File System (GPFS)
- The cluster platform, is aptly named “iQudu” (isiXhosa name for Kudu. The name symbolises the agility, speed and size of the cluster). Cluster: iQudu

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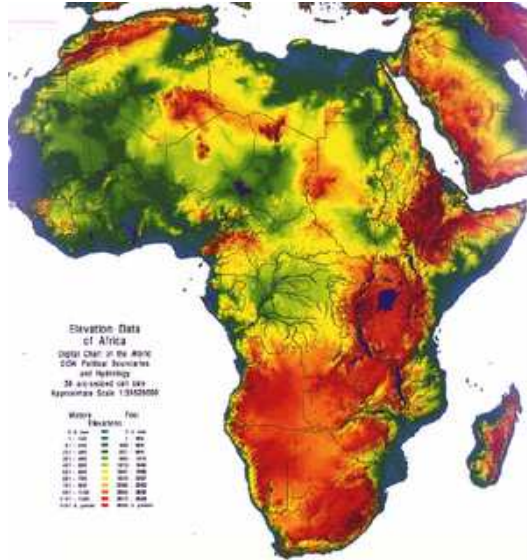
research and educat

HPC facilit

chroni

relevan

Examples of what will CHPC be doing



- Develop new regionally specific **climate change scenarios for 2025**; resource planning in the Western Cape based on models developed from quantifying rainfall vulnerability coupled with impact of increased population growth in the region.

Speed up the development of vaccines by studying fragments of 'foreign' proteins that have been shown to trigger a response by the immune system; search for common patterns in the sequences or structures of those proteins and use that information to create a theoretical model of the features that cause the fragments to trigger the immune response. These methods are specifically applicable to the AIDS and malaria vaccine projects.



What are eResearchers worried about?

- How do we describe & catalogue the artefacts, resources, experiments & knowledge we have so that others can find, use, and understand these things?
 - What are effective carriers of meaning (between researchers) in our field?
 - Can these carriers be represented / emulated in systems? How?
 - How much do we need to rely on top-down imposition of meaning? And how much on bottom-up?
 - Can we reason across geological settings?
- How do we fit knowledge computing into current work practices?
 - How do we engineer knowledge capture so that it is as unobtrusive as possible?
 - How do we maximize utility of captured knowledge in future work?
 - Governance: who gets to make the rules?

Further challenges facing eResearchers

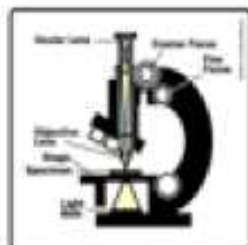
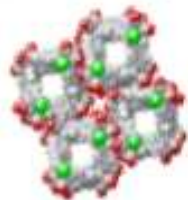
- Preserving digital content and even understanding what "preservation" means
- The absence of practices for refreshing and migrating both data and relevant retrieval software
- Capture (archiving) and selection, as well as providing sufficient metadata or other descriptive or administrative information to ensure adequate (as well as legal) access and retrieval over the long term to electronic content created
- Insufficient knowledge of the software applied and an inability to find relevant information
- Missing or ignoring standards as well as obstacles related to licensing and accountability
- **Bottom line: without 'librarian'-skills (adapted to the eResearch environment) researchers will not be able to benefit fully from their own past – they do not wish to be librarians**

FUNDING DATA COLLECTION PROCESSING PUBLICATION

- NO DETAIL PLANNING
- VARIETY OF SOURCES
- GENERIC PLANS
- AWARENESS OF NEED TO MAKE DATA AVAILABLE



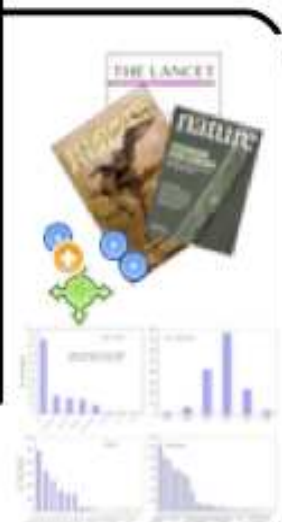
- VARIED ORIGINS, FORMATS, SIZES, USEFULNESS TO OTHERS
- DATA COLLECTION FROM PRINTED



- STORED ON DEPARTMENTAL SERVERS OR DESKTOPS
- SOME HORROR STORIES
- POOR ANNOTATION
- SHARING BY EMAIL OR PORTABLE MEDIA
- STORAGE AND SHARING PROBLEMS WITH BIG DATASETS



- FEW DEPOSITS IN NATIONAL ARCHIVES
- PUBLICATION ON THE WEB
- USEFULNESS OF LINKING DATA AND PUBLICATIONS



SUPPORT

- LITTLE AND MAINLY FROM IT OFFICERS

When asked, Oxford scientists requested:

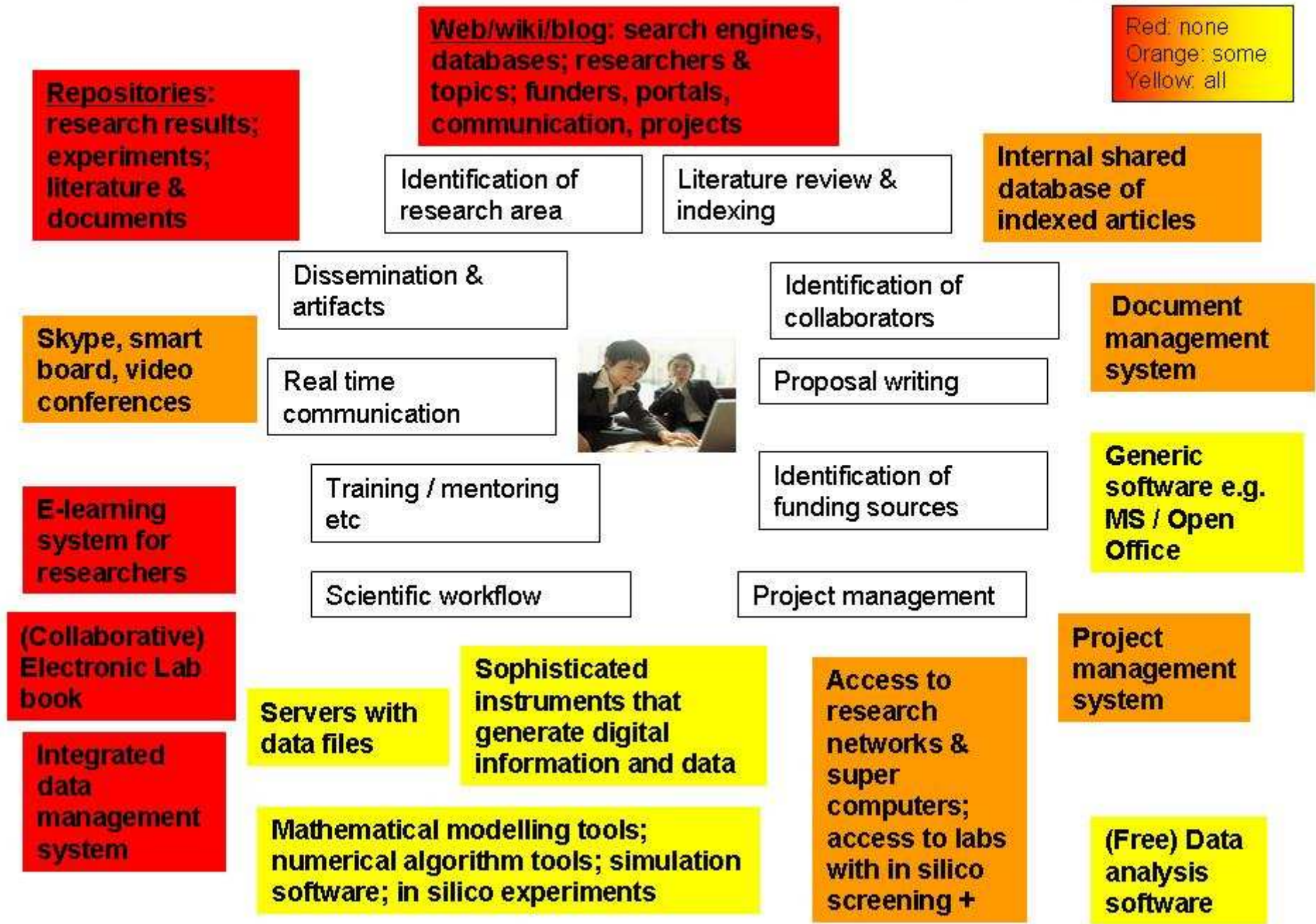
- **Advice on practical issues** related to managing data across their life cycle. This help would range from assistance in producing a data management/sharing plan; advice on best formats for data creation and options for storing and sharing data securely; to guidance on publishing and preserving these research data.
- A **secure and user-friendly solution** that allows storage of large volume of data and sharing of these in a controlled fashion way allowing fine grain access control mechanisms.
- A **sustainable infrastructure** that allows publication and long-term preservation of research data for those disciplines not currently served by domain specific services such as the UK Data Archive, NERC Data Centres, European Bioinformatics Institute and others.
- **Funding** that could help address some of the departmental challenges to manage the research data that are being produced.



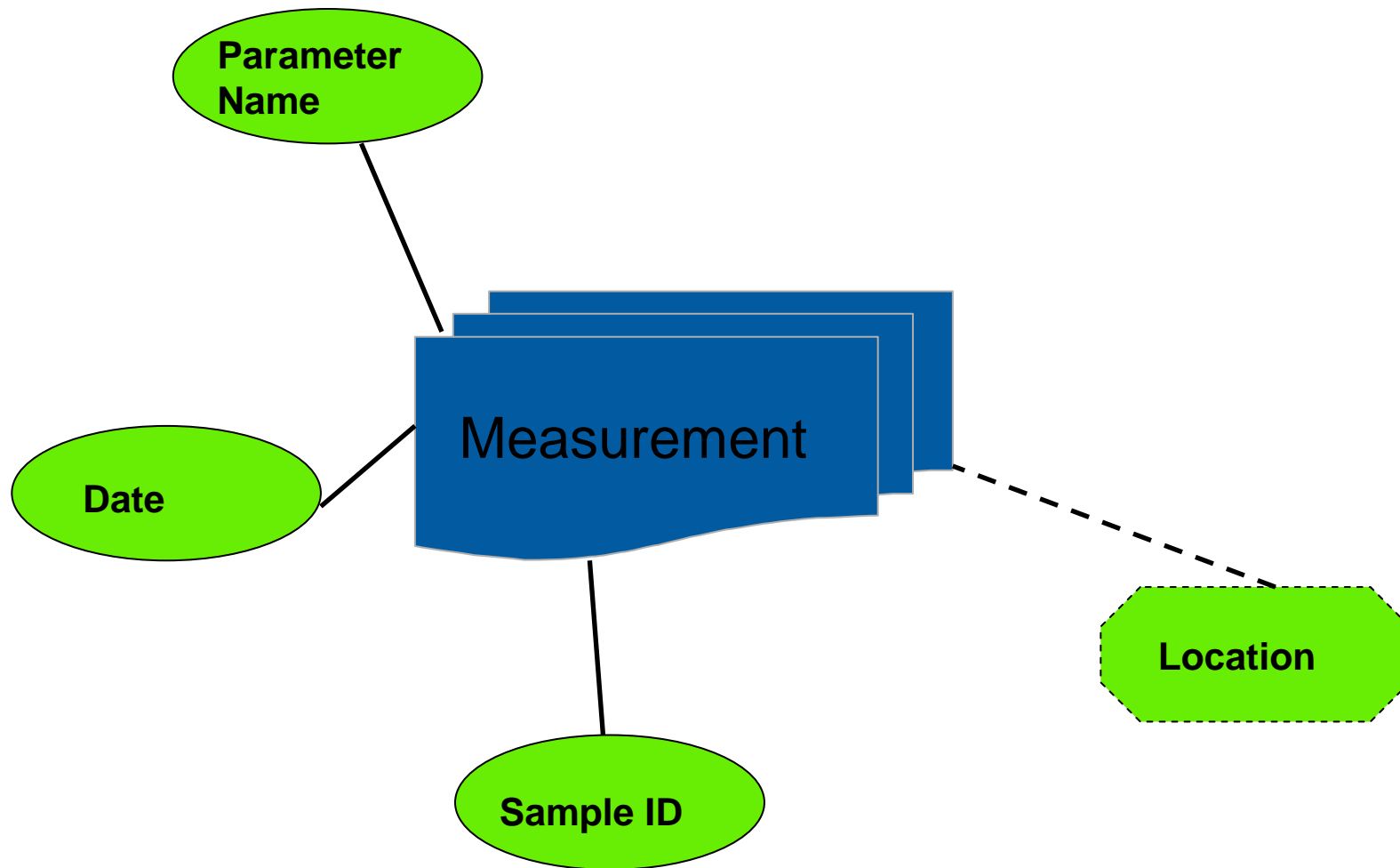
Luis Martinez Uribe
Digital Repositories
Research Co-ordinator

SAMI VRE components

Red: none
 Orange: some
 Yellow: all



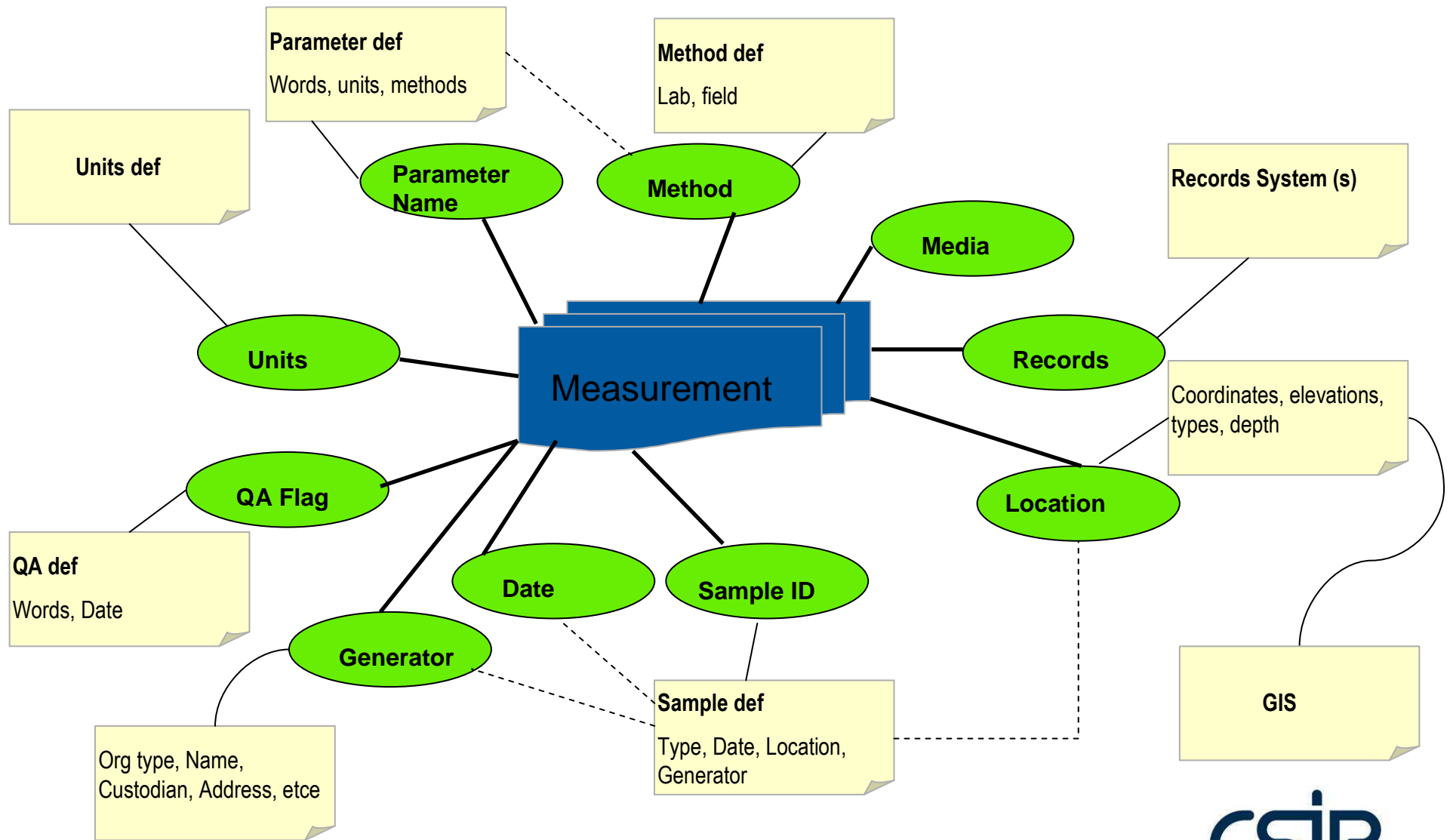
Single experiment view of data

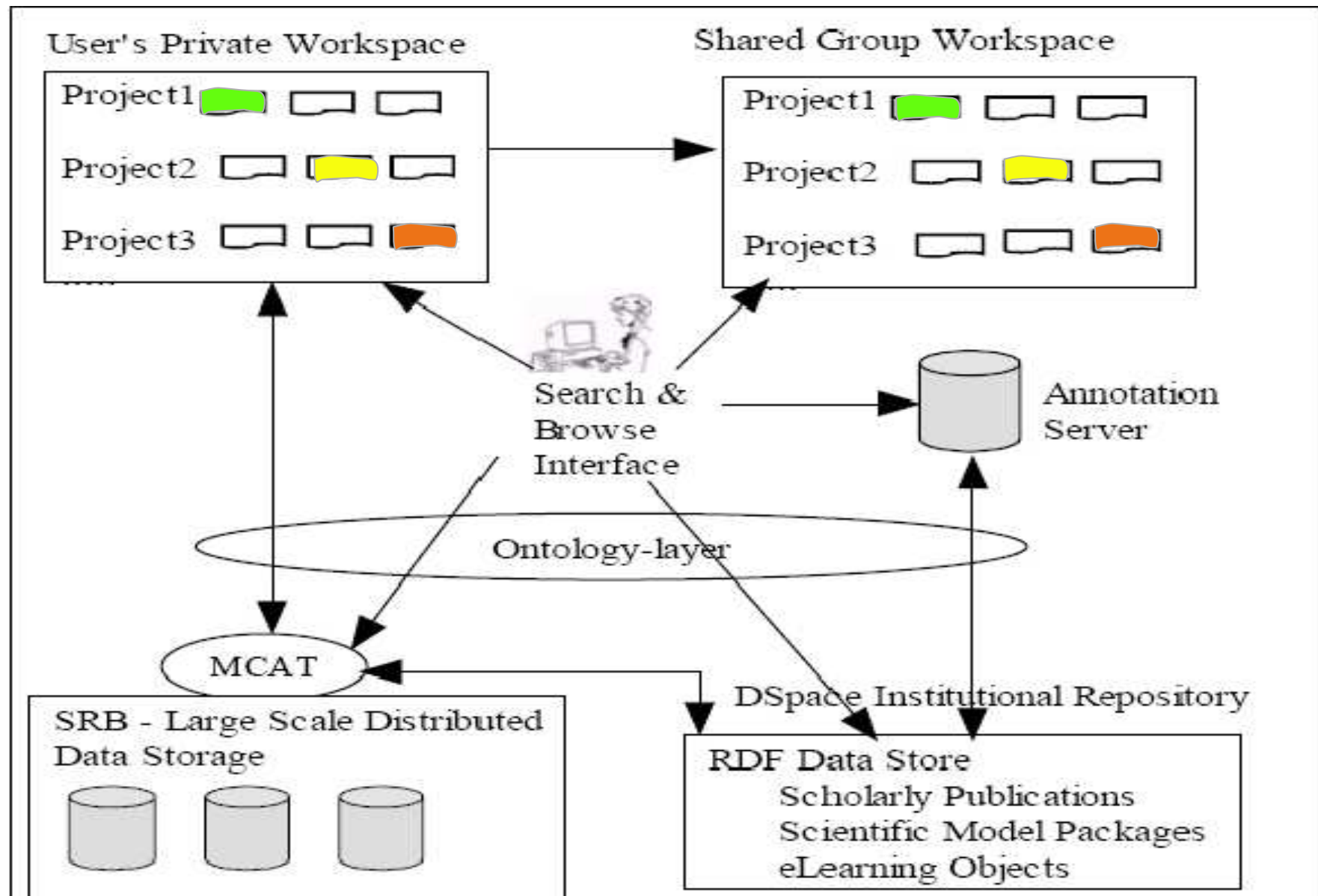


Source: McCord, R. 2005

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Integrated System & Curation View





Different storage areas envisaged in an scientist's ideal environment, and the relationships between them (Hunter)

Malaria VRE demonstrator

The screenshot shows the Malaria VRE demonstrator website interface. The browser address bar displays <http://11.127.215.229/Java/index.htm>. The page features a navigation menu on the left with options like 'User Menu', 'Administration Menu', 'View Account', 'Edit Account', 'Notifications', 'Inbox', and 'Logout'. The main content area is divided into sections: 'Progress Date' (Due dates for progress reports due 30 September), 'Upcoming Events' (Laa di daa), 'Welcome' (with an image of a malaria parasite), 'News via Yahoo' (ADV: Slide in Banner Exchange for Webmasters), and 'Latest publications on malaria' (Click here to run an automated Google Scholar search, Click here to go to Malaria Journal). On the right, there is a 'Private Space' section with a list of users (Bridgette, Linda, Martie, Zoleka) and various tools and resources (Tools for data mining, Tools from NCBI, Shared Resources, Identification of collaborators and funding, Repository, Dissemination and Artefacts/Literature review, Project Management, Project Management for the research team, eLearning, Sakai's logo Training and mentoring for the researchers, Instant Messaging, MSN Messenger Icon Real time communication). Annotations in red and green boxes highlight specific areas: 'Personal space' (orange box) points to the 'Progress Date' and 'Upcoming Events' sections; 'Open space' (red box) points to the 'Welcome' section; 'Shared space' (orange box) points to the 'News via Yahoo' section; 'Blogger' (green box) is associated with the 'Private Space' user list; 'Google tools for document management' (green box) is associated with the 'Tools for data mining' and 'Tools from NCBI' sections; 'Media Wiki' (green box) is associated with the 'Identification of collaborators and funding' section; 'DSpace' (green box) is associated with the 'Repository' section; 'WebCoLab' (green box) is associated with the 'Project Management' section; and 'MSM/Google Groups' (green box) is associated with the 'Instant Messaging' and 'MSN Messenger Icon Real time communication' sections.

What can librarians do? ... Traditional ...

- Select, acquire, and license data and data sets;
- Create metadata (or metadata standards) for discovery and description of data sets ... but at eResearch scale
- Creating and/or organize documentation related to data
- Offering preservation services for digital data
- Advise on the appraisal and selection of what data to keep for the long term

What can librarians do? ... Traditional 2 ...

- Assist users with finding data relevant to their research, using third-party high level directories and data discovery sources
- Develop data publication standards and systems
- Publishing workflows, global identifier schemes, linking schemes, standards for data clean-up and normalization, and also standards for providing credit and recognition to data authors
- Develop practices for rights management (– how do you site data sets?)
- Offer long-term repositories of scholarly output

What can librarians do? ... New

- Position themselves as partners in research – embedding themselves
- Create more dynamic repositories that support pre-publication workflows
- Learn to practice eResearch themselves!

eResearch Support Framework

Accountability

Senior Management

Development & innovation

Trial/experimental Resources/Tools and Activities	New initiatives
Commercial Resources	Blogs
Free Resources	Database of Digitization of maps
Tools	Creation of integration standards
New IT solutions (eg HPC)	Identification and evaluation of research tools
	VREs
	Repositories

Function

Activities

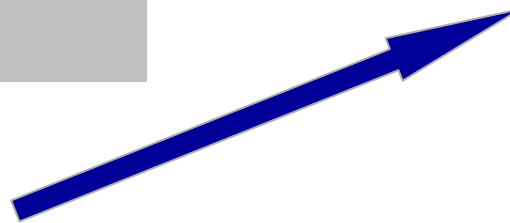


Transfer if suitable and when funding is available

Service delivery

Unique Resources/Tools	Shared Tools, Resources & Services
Commercial (eg SA Journal of Mining)	Commercial (eg SciencDirect)
Internal (eg Tree database)	Open Access
Tools	Internal (eg ToDB)
IT Infrastructure	Tools (eg RefWorks)
Necessary bandwidth	
Link to SANReN/ Cluster/ Cloud	
Maintenance (including security and back-up)	

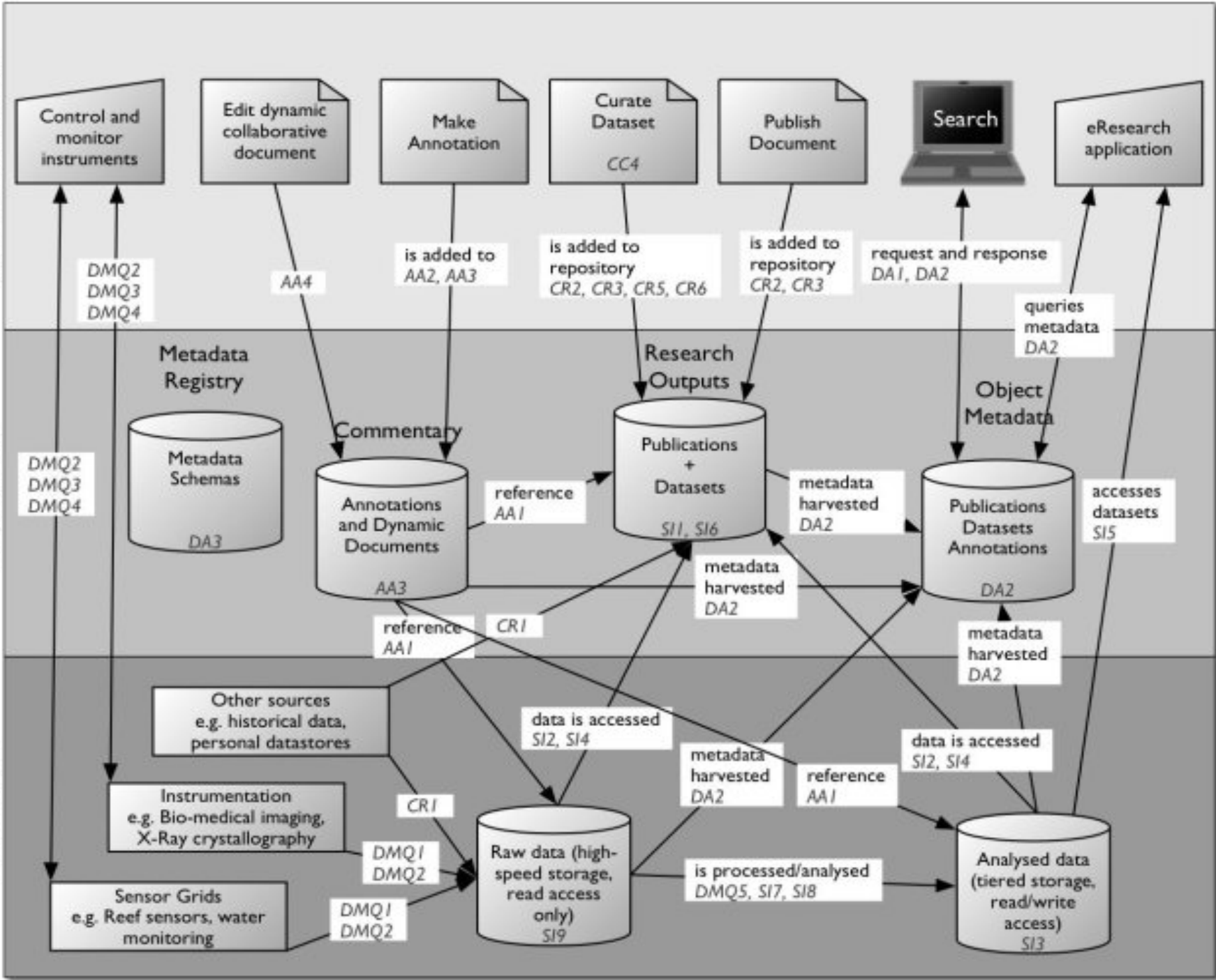
Responsibility



Lead User/ Researcher's Forum

Research team

Researchers/Readers



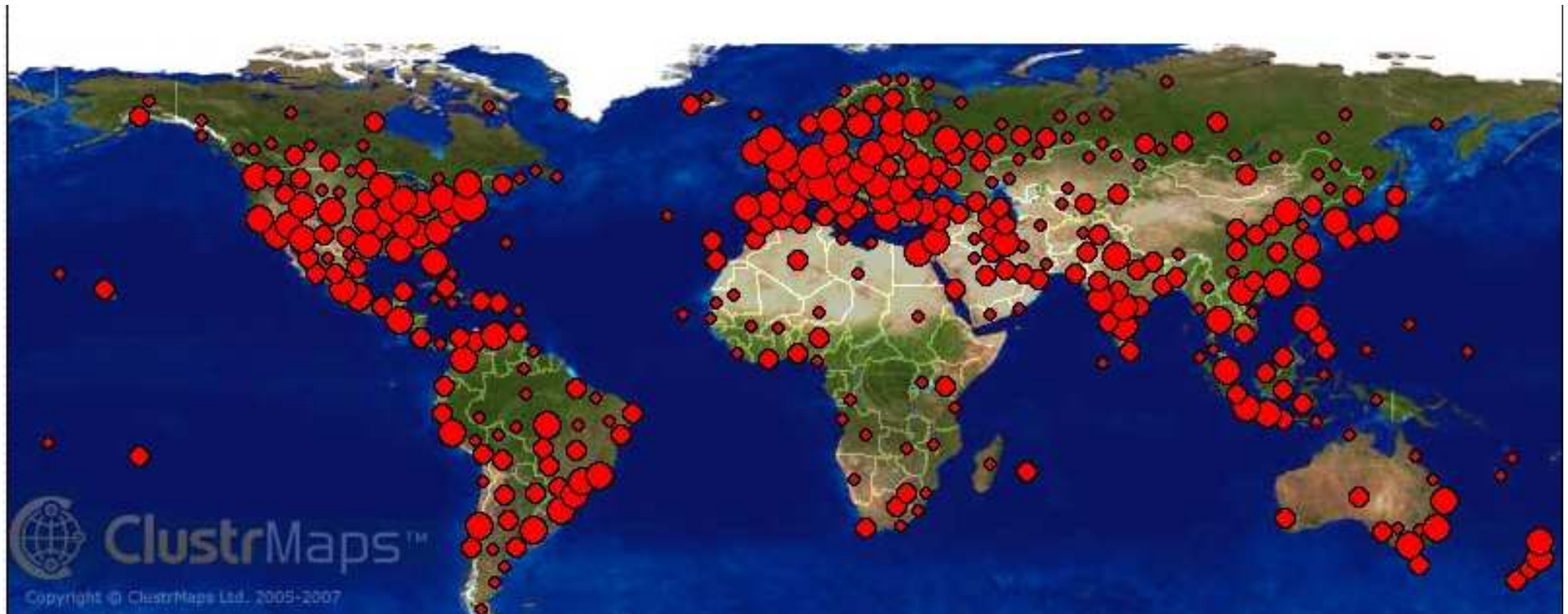
LIS

Repositories

ICT

Data Sources

Learn to visualise (eg find out more about our users)



UPSpace at the University of Pretoria: Campus Buildings - Microsoft Internet Explorer

UPSpace
University of Pretoria

Search UPSpace
Advanced Search

Campus Buildings
Community home page

Search for: Campus Buildings

or browse: Titles Authors Subjects By Date

Sign on to:
Receive email updates
My UPSpace authorized users
Edit Profile

The architectural wealth of the University of Pretoria represents all the schools of thought of the most important building styles of the past hundred years. It comprises a compact and highly accessible collection of impressive buildings that includes from the Neo-Classics to the latest innovations of the Post-Modern period.

It is the sensitive integration of functional needs and contemporary technological solutions that distinguishes the UP campus and makes each facility and façade unique. To be able to appreciate

25.754439, 28.230058 - Google Maps - Windows Internet Explorer

Google Maps

Get Directions My Maps

Results 1 - 1 of about 1 for "-25° 45' 15.96", +28° 13' 48.21"

-25° 45' 15.96", +28° 13' 48.21"

25.754439, 28.230058

Get directions To here - From here
Search nearby - Save to My Maps

https://www.up.ac.za/dspace/bitstream/2263/6556/1/05%20Merensky%20Library-Virtual%20rendered-night.jp - Microsoft Internet Explorer

Google 3D Warehouse

Search for: Models Collections

000518 OKU 313 University Pretoria > New Merensky Library

New Merensky Library by Leon Finaar

ImageMap

Views (7 days): 3
Downloads (7 days): 5
View in Google Earth

Download Model
Rate this model

No ratings

Library

Uploaded on June 3, 2008

Collections containing this model

100
000518 OKU 313
University Pretoria

Related items
More models by Leon Finaar

Other models you might like

Model complexity What's this?

Moderate

Learn to collaborate and co-create



http://en.wikipedia.org/wiki/Image:Web_2.0_Map.svg

- My Diigo Tags
- projects
- data-curation
- data-management
- article
- report
- data-repositories
- e-research
- metadata
- open-data
- data-preservation
- interoperability
- standards
- data-policy
- data-formats
- data-sharing
- project
- library
- data-publication
- data-legal-frame-work
- data-centre
- bodies
- fedora
- data-management-system
- data
- repositories
- services
- data-citation
- conference
- support
- data-storage
- data-training
- plane
- manual
- canada
- no_tag
- education
- data-policies
- version-control
- data-selection
- data-archive
- book
- data-igest
- data-manual
- data-support

Connotea
logged in as Declan
My Library | Registration
Home | Latest News | About This Site | Site Guide | FAQ | Popular Links | Recent Activity | Contact Us

Users who used AvianFlu:
dabian
Declan
Declan
diseasezoo
amans
saco
joanna
lucbach

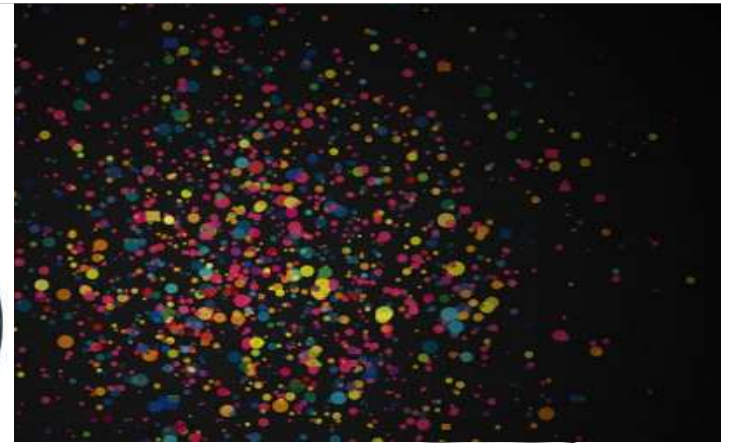
Bookmarks matching tag AvianFlu
Number of bookmarks per page: 10 | 25 | 50 | 100

WHO: I Avian influenza... situation in China, Thailand - update 47 (info)
http://www.who.int/csr/bon/2005_12_09/avindex.html
Posted by Declan to Thailand: AvianFlu cases in China on Fri, Dec 09 2005 at 17:59 UTC

A flu drug to be made in arcater quantities - The Boston Globe (info)
http://www.boston.com/yourlife/health/diseases/articles/2005/12/09/a_flu_dr

76 UTC
9:1412 -- BM3 (info)
Senator - Forbes.com (info)
99 UTC

Tools:
Add a bookmark
Create a new group
Create a tag note
Rename a tag
Bookmarklets
Import from local file
Export my library
Open/SL settings
Edit my registration



Logos include: skobse, shadovys, groveee, You Tube, Zimbra, smugmug, newsgator, Biognoscient, TIN, FINGER, shutterfly, podDatee, Feedster, favoor, Planzo.com, ZAZZLE, Tailrank, TagWorld, nuvo, diggear, yakalike, grouper, ODDPOST, QOOP, inads, Lulu, R, blich, flagr, FireAnt, simply hired, Veoh, ineadcloud, rbloc.com, Renkoo, pix: gogon, meebp, gather, Anatra, browser, oyogi, cafePress, standpoint, lost.fm, Jotspot, Frapp, jeteys, dabble, YEDDA, SHOUTWIRE, iKarma, wayfanna, gOFFICE, tech, memorandum, Calendariub, Writeboard, gOFFICE, Suprghu, pandora, Findory, backlence, ellipmarica, nyo, WordCast, Opiny, reddit, measuremap, gumtree, bluopulse, niva, STREAMLOAD, Teda Lists, FeedSky, jelly Barn, INC, nativetext, CONGOO, PODZINGER, KSS, MAD, FeedTier, phanfare, Fruitcast, Pubs, elPolls, flickr, Ning, Ookles, Strongspace, zoominfo, CASTPOST, Wikipedia, yubmub, AC, Blog, ProjectSpaces, FeedBurner, Bloglines, volume.com, Fotolog, ourmedia, gabbnoom, Gcast, openomy, Yub.com, ajchat, myspace, NewsAlley, Allmydata.com, chatsum, PANDORA, looklater, e, jambo, ClipShack, WebJav, PLIZES, Noodly, 30, wofdir, diigo, box, Jots, Xerive, vizu, digg, del.icio.us, drive, AlmondRocks, Tagyu, 30, writely, Simply, Gtalk, TRUVEO, egoSurf, quimble, pegasus, squidoo, picturecloud, newsvine, clipfire, mozy, Basecamp, facebook, Netvibes, GLOWay, My Video Karaoke, Lexxe, alpha, LOOKSTER, Ning, PXNS, measuremap, 43 Things, Technorati, Plistic, Backpck, Gmail, velp, Ksmarkets, Inform, magna, shozu, uva, dream



BLOGS & WIKIS



13, 23, 43 Things: Create. Share. Network

- Blogging
- Photos & Images – Flickr & mashups
- RSS & Newsreaders
- Social Tagging – del.icio.us, Connotea
- Social Networking – Facebook, LinkedIn
- Tagging, Folksonomies & Technorati
- Wikis
- Online Applications & Tools – online office/ design
- Podcasts, Video & Downloadable Audio - YouTube
- Next Generation OPACs

Next generation OPACs

- As times have changed, our OPACs have not kept up. End-users want more from their library catalogs. They want the ability to create mash-ups with other services (e.g., LibraryThing), save catalog data in new and different ways (e.g., Zotero), and much, much easier findability (e.g., through faceted browsing.)



- "If you love books, and love people who love books, LibraryThing is for you. Start by using the service to catalog your book collection: Tag your books by topic, share your catalog with others, and then endlessly browse the titles that they have on their shelves. The utterly book obsessed can add the LibraryThing widget to a blog to show visitors what they have been reading lately."

[PCWorld](#) (February 2006)

zotero

The next-generation research tool.

Library of Congress Online Catalog

http://catalog.loc.gov/cgi-bin/Pwebrecon.cgi?iv1

The Library of Congress

LIBRARY OF CONGRESS ONLINE

Help | New Search | Search History | Headings List | Titles List | Request an item

DATABASE: Library of Congress Online Catalog
YOU SEARCHED: Title = shakespeare: the invention of the human
SEARCH RESULTS: Displaying 1 of 1.

Previous Next

Brief Record | Subjects/Content | Full Record

Shakespeare : the invention of the human

LC Control Number: 98021325
Type of Material: Book (Print, Microform, Electronic, etc.)
Brief Description: [Bloom, Harold](#)
Shakespeare : the invention of the human / Harold

Title	Creator
Shakespeare Criticism	Anne
Twentieth-century Shakespeare	Berry
Shakespeare : The Invention of the Human	Bloom 2
shakespeare.jpg	
Bloom makes a bold statement	
Shakespeare, Theory, and Criticism	Bulman
Political Criticism of Shakespeare	Cohen 1
Coleridge's Shakespeare	Coleridge...
AC Bradley and his influence on Shakespeare	Cooke
Shakespeare After Theory	Kastan 1
Google Scholar Link to Shakespeare Criticism	
Shakespeare Criticism 1	Ridler

Info | Notes | Attachments | Tags | Related

Book

Title: Shakespeare : The Invention of the Human
Author: Bloom, Harold

Saving Item...
Shakespeare : the invention of the hu...

Edition:
Place: New York
Publisher: Riverhead Books
Date: 1998

zotero

Automatic capture of citation information from **web pages**

Flexible notetaking with autosave

Playlist-like library organization, including saved searches (smart collections) and tags

Runs right in your web browser

Free and open source

Saves records and notes in any language; interface available in  with **more on the way**

Storage of PDFs, files, images, links, and whole web pages

Fast, as-you-type search through your materials

Platform for new forms of digital research that can be extended with other web tools and services

Formatted citation export (over 1100 styles and growing)

Integration with **Microsoft Word** and **OpenOffice**

Integration with **WordPress** and other blogging software

Librarian 2.0

- Recognises that the Library is human
- Plans for the users: breaks down barriers and allow users access wherever they are: home, work, commuting, school, or at the library.
- Embraces Web 2.0 tools recognizing how services might be enhanced by the Read/Write web and how new services might be born in a climate of collaboration.
- Controls techno-lust - does not buy/use technology for the sake of technology.



Michael Stephens

Web 2.0 Librarian cont

- Makes good, yet fast decisions: comfortable with perpetual beta & redesigns for ease of use, user involvement and easily added/re-configured pieces
- Trendspotter :
 - seeks out information and news that may impact future services
 - reads outside the profession and
 - watches for the impact of technology on users and new thinking on business
- Knows how to get content - understands that the future of libraries will be guided by how users access, consume and create content
- Listens to staff and users when planning, tells the stories of successes and failures, learns from both, celebrates those successes, allows staff time to play and learn, and never stops dreaming about the best library services

In the Job Jar of Oxford's Digital Repositories Research Co-ordinator

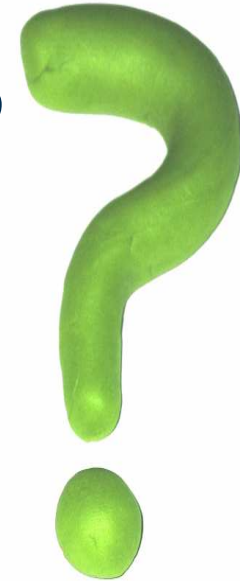
- Capture and document researcher's requirements for digital repositories services to handle research data
- Participate actively in the development of an interoperability framework for the federated digital repository at Oxford
- Make recommendations to improve and coordinate the provision of digital repository services for research data

In the Job Jar of Oxford's Digital Repositories Research Co-ordinator 2

- Initiate and develop collaborations with the different repository activities already occurring to ensure that communication takes place in between them
- Raise awareness at Oxford of the importance and advantages of the active management of research data
- Communicate significant national and international developments in repositories to relevant Oxford stakeholders, in order to stimulate the adoption of best practices

Key question: do you manage a ...

- Paper based library which also gives access to electronic resources?
- Electronic resources library which also gives access to paper collections?
- Challenge: perhaps the library should become more like a lab and less like a warehouse! (... with apology to Jim Jacobs – retired data-librarian University of California, San Diego)





“The world we have created today has problems which cannot be solved by thinking the way we thought when we created them.”

-Albert Einstein

... also applicable to librarians



Scientific progress
depends on speedy and
open access to the full
spectra of scientific data
and derived products

(Hunter, 2006)

... remember ...



Slide 47

Additional references

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