Title
Ocean Informatics Monograph. Ocean Informatics Initiative: an Ethnographic Study (2002-2006). Part 2: Appendices

Authors
Millerand, Florence
Baker, Karen S

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OCEAN INFORMATICS MONOGRAPH

Ocean Informatics Initiative:
an Ethnographic Study (2002-2006)
Part 2: Appendices

Florence Millerand[1] and Karen S. Baker[2]

[1]Department of Social and Public Communication, University of Quebec, Montreal (UQAM)
[2] Scripps Institution of Oceanography, University of California, San Diego (UCSD)

This is an ethnographic study of the development of Ocean Informatics,
an initiative to grow digital infrastructure that addresses
field-oriented, scientific data and information needs.

Scripps Institution of Oceanography Technical Report
June 2011

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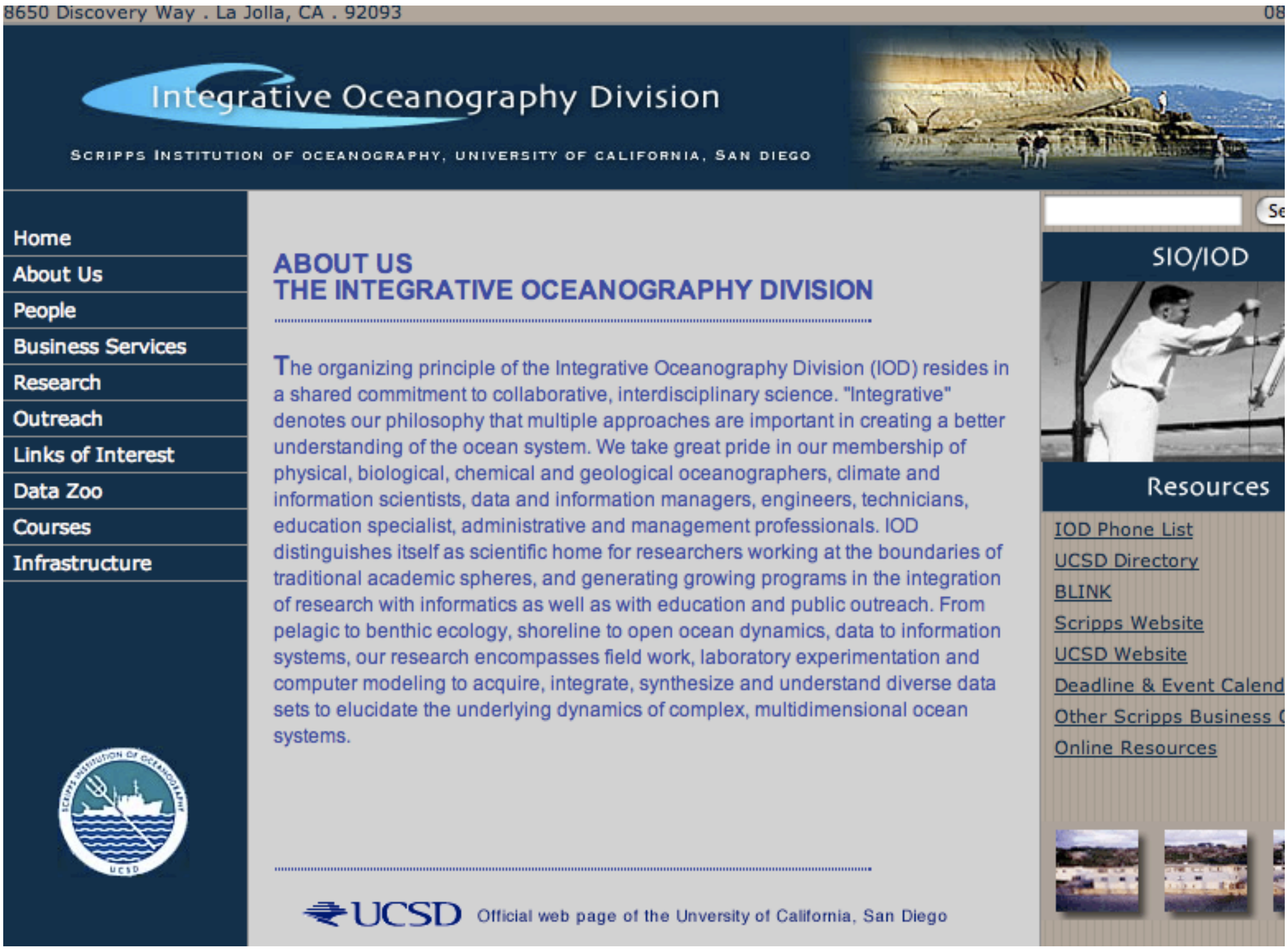
Abstract

The report presents an initial monograph on Ocean Informatics (OI), an information infrastructure initiative in the ocean science community. Using ethnographic methods, we observed and analyzed the development of the OI Initiative based at Scripps Institution of Oceanography over a period of 4 years (2002-2006). The focus of the report is the formation of an information environment that provides information management and information systems design expertise focusing on biological and ecological oceanography in particular. OI is specifically framed as conducive to support of scientific data practices, data curation, design practices, and information managers' professional development when our understanding of these elements is under development amidst an era of transitions relating to digital data production and access. The effort aims to address short-term needs for information management while formulating and planning for the growth of infrastructure over the long-term. As an interdisciplinary initiative that spans multiple organizational units, its development is framed by a keystone relationship with the scientific environments with which it partners and within which it is embedded. It began as an oceanographic site in the Long-Term Ecological Research program (LTER) and subsequently partnered with the California Cooperative Fisheries Investigations (CALCOFI) as well. In bringing new attitudes and insights relating to living systems, the ecological perspective may also have significant ramifications in considering digital configurations. The OI Initiative highlights the envisioning of infrastructure efforts as having local, situated elements and how such efforts contribute to science today. The report captures the views of the diverse participants associated with the Initiative, thus providing a living portrait of Ocean Informatics whose development continues today. The report is in two parts with appendices appearing in a separate volume as Part 2.

Appendices

1 Appendix: Integrative Oceanography Division (IOD) Web page

The Integrative Oceanography Division web page text was inspired and developed by Ocean Informatics participants.



COMPUTATIONAL INFRASTRUCTURE SERVICES (CIS) THE INTEGRATIVE OCEANOGRAPHY DIVISION

ABOUT US

IOD's physical computational infrastructure consists of a multi-platform array of servers, providing email, file, and other network services. The infrastructure team maintains the integrity of these servers and provides user support for both network and local resources.

CONTACTS

Computational Infrastructure Services Team

Jerry Wanetick (Director)
Nate Huffnagle
Charles Baker

CIS Help Desk email - help@coast.ucsd.edu

CIS Help Desk Phone - **858-246-0555** (x60555 on campus)

UCSD Contacts

UCSD Official web page of the Unversity of California, San Diego

2 Appendix: UC Marine BioOptics

Overview from 1999 SIO report about the University California Marine BioOptics cross-campus group.

UC Marine Bio-Optics Group

RAYMOND C. SMITH
KAREN S. BAKER

University of California Marine Bio-Optics (UCMBO) is a new IMR multi-campus group formed in 1981 with centers at the University of California at San Diego co-ordinated by Karen S. Baker and at the University of California at Santa Barbara directed by Professor Raymond C. Smith. This group is concerned with investigating and understanding the role of radiation in natural waters in order to quantitatively describe and predictively model the marine photoenvironment and the corresponding bio-optical ocean properties. In pursuit of these goals, instruments are designed, measurements are made at sea and analysis and computer modeling are carried out. Since the changing marine light field is directly related to and is an influencing factor for physical, chemical and biological water properties, the UCMBO investigations are multi-disciplinary. For instance, a bio-optical model relating dissolved and suspended biogenous material in ocean waters to the corresponding optical properties has been developed and continues to be improved. Multispectral satellite imagery and multiplatform sampling strategies (ships, satellites, buoys and aircraft) are used to examine the distribution and variance of phytoplankton biomass. The relation of this biomass to regional productivity and the mesoscale ocean phenomena influencing phytoplankton distributions and productivity are research objectives of the group.

This group is composed of approximately ten people including five UCSB graduate students. Recent projects have initiated strong collaborations with other groups including the IMR Food Chain Research Group at SIO, the Rosensteil School of Marine and Atmospheric Science Group located at the University of Miami, the Warm Core Ring Group with field work out of Woods Hole Oceanographic Institution and the Optical Dynamics Experiment Group organized through the University of Oregon. Interaction continues with the National Aeronautic and Space Administration Laboratories at Pasadena, California (Jet Propulsion Laboratory) and at Virginia (Wallops Space Flight Center) as well as with the Environmental Protection Agency Laboratory at Athens, Georgia.

Major areas of investigation for the 1979-1984 time period include (1) Southern California Bight studies; (2) warm core rings project; (3) optical dynamics experiment; (4) bioluminescence and optical variability study; (5) ultraviolet radiation and suspended sediment studies.

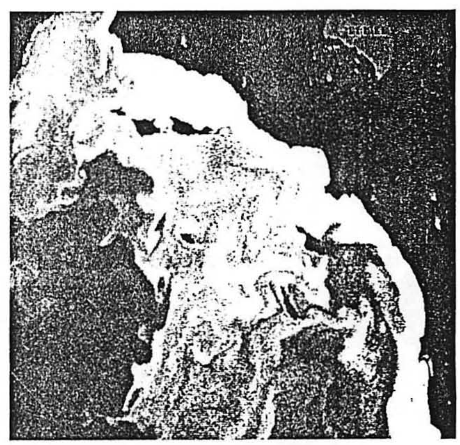


Figure 38. A calibrated image (Nimbus 7 satellite, Coastal Zone Color Scanner instrument) of the Southern California Bight region on 6 March 1979. The land and cloud areas are masked black. In the water, the lighter the area, the higher the chlorophyll on a scale from .01 mg/chl/m^3 (black) to 5mg/chl/ m^3 (white).

Southern California Bight Studies. An investigation of the distribution and variance of phytoplankton over a full range of space and time scales has been undertaken in order to obtain a more basic understanding of mesoscale biological processes in productive coastal waters. Complementary ship and satellite (Nimbus-7 satellite Coastal Zone Color Scanner instrument) bio-optical data from the Southern California Bight Region has been obtained for many time periods. An initial chlorophyll time series has been published giving a quantitative assessment of chlorophyll and its variance in these waters and the group is currently working to provide a quantitative time series of chlorophyll distribution and of sea surface temperature for a longer time period. It has been found that in a period of less than two weeks the integrated chlorophyll in the Bight changed by more than a factor of two. In collaboration with D. Au (National Marine Fisheries Service) and P. Dustan (College of Charleston) we are also investigating the possibility of using sea-surface temperature and chlorophyll as determined by ship and satellite as habitat descriptors related to the distribution of marine mammals. This work has been sponsored by the National Aeronautics and Space Administration.

The California Space Institute sponsored a multi-campus investigation of an integrated remote sensing program particularly for the study of California's coastal zone. It also sponsored the collaborative work between R. W. Eppley and UCMBO.

The California Sea Grant College Program has furthered UCMBO studies of the phytoplankton dynamics in eutrophic coastal water by sponsoring a pilot program to examine problems related to the database management of disparate data sets obtained from multiplatform sampling strategies. In addition, this program has provided two Sea Grant Traineeships for the training of graduate students in the relatively new skills of ocean remote sensing.

Warm Core Rings (WCR). UCMBO participation in the WCR project which involves more than 25 principal investigators at thirteen different institutions has been sponsored by the National Aeronautic and Space Administration. A warm core ring forms when a meander separates to the north of the Gulf Stream to form an anticyclonic vortex. This project conducted an interdisciplinary study of the structure and the dynamics of Gulf Stream warm core rings by carrying out a series of multi-ship cruises to follow the evolution of a ring. Rings range in size from 30 to 150km in diameter and exist in depth to hundreds of meters. They exist for a period ranging from months to over a year and travel as a body in a general southwesterly direction from latitudes of approximately 40 degrees north to as far south as 28 degrees while maintaining their own internal clockwise rotation.

Figure 39. Nimbus 7 image of the Atlantic coast on 25 April 1982. The land is masked. In the lower right corner, the Gulf Stream is visible. A meander in the stream is forming. A detached Warm Core Ring is visible in the lower center. Both the Gulf Stream and the Warm Core Ring have lower chlorophyll values than the surrounding waters. Image processed at RSMAS, University of Miami.

The primary objective of the UCMBO participation has been to determine the bio-optical properties and the distribution and variance of phytoplankton biomass of a warm core ring. The spatial and temporal variability of these properties, as well as related hydrodynamic properties, throughout the evolution of several rings have been observed through the use of a newly designed state-of-the-art Bio-Optical Profiling System (BOPS) instrument during participation in five WCR cruises in 1981-1982. The analysis of over 100 days of along-track and on-station ship data in concert with contemporaneous data from NASA P3 aircraft flying an Airborne Oceanographic Lidar system and with color and temperature satellite data is providing an understanding of the mesoscale processes influencing primary production and the distribution and variance of phytoplankton biomass in WCR's and their environs as well as demonstrating the effectiveness of multi-platform sampling strategies. Specific bio-optical data has been obtained for the investigation of the radiometric sensitivity of the Coastal Zone Color Scanner satellite instrument which will aid in the calibration of and the algorithm development for that instrument.

Optical Dynamics Experiment (ODEX). ODEX, sponsored by the Office of Naval Research, has as its goals the development and testing of oceanic models in the upper mixed layer linking physical, biological and optical properties with respect to physical forcing functions such as winds and storms. Complementary color and temperature satellite images were captured to provide an overview to the 1982 field program.

The first major at sea data collection segment of ODEX occurred in October and November of 1982 in the North East Pacific (141°N, 35°W) with scientists aboard the Naval Post Graduate School's R/V Acania and the Scripps' R/P Floating Instrument Platform (FLIP). Optical, physical, biological, and chemical oceanic parameters were sampled intensively over a grid of stations in order to delineate synoptically the structure of an apparent instability in the subtropical ocean front. Nearer shore sampling was carried out in order to be able to contrast the oceanographic structure at the site with the waters of the California Current and the transition waters in between. Further field programs near the 35°W latitude line continue in order to investigate seasonal variability in this region.

Bioluminescence and Optical Variability in the Sea (Biowatt). This is a recently initiated study with the goal of identifying causal links between the variability in light attenuation and light production in the ocean. The issues addressed include behavioral relations among macrozooplankton and micronekton, to the dynamics of absorbancy and scattering populations, to the physical dynamics of the upper layers of the ocean. Field work includes an Atlantic cruise in 1985.

Ultraviolet Radiation and Suspended Sediment Studies. This work, funded by the United States Environmental Protection Agency, consists of empirical as well as theoretical studies. Aquatic photochemical and photobiological processes depend upon both the amount and the spectral composition of solar radiation penetrating to depth in natural waters and are often found to be particularly effected by the ultraviolet region of the spectrum. A predictive model of the spectral radiant energy of natural waters (with particular emphasis in the UV portion of the spectrum) in terms of their biogenous components as well as their suspended sediments has been developed. This model allows the assessment of photochemical processes (e.g., photolysis rates) that account for the transformation of pollutants in aquatic environments. Laboratory studies using a submersible ultraviolet spectroradiometer and computer studies using Monte Carlo modeling techniques have helped in our quantitative modeling of these photoprocesses.

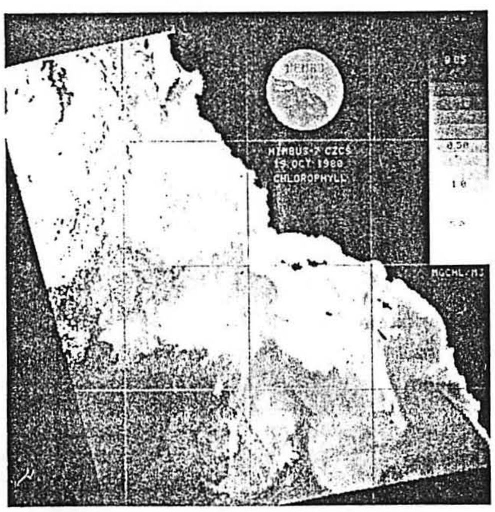


Figure 40. Satellite image from 19 October 1980 of the ocean off the Southern California coast where land is black and clouds are white. The optical data from the Nimbus 7 satellite Coastal Zone Color Scanner instrument has been atmospherically corrected and absolutely calibrated to produce an image of chlorophyll-like pigments.

3 Appendix: Research Publications about the Ocean Informatics initiative

Technical Reports

Baker, K.S. (2005). *Informatics and the Environmental Sciences*. Scripps Institution of Oceanography (SIO) Technical Report Series, University of California San Diego. http://escholarship.org/uc/item/0179n650

Millerand, F. and K.S. Baker (2011). Ocean Informatics Monograph (2002-2006). Technical Report Series. University of California San Diego.

Baker, K.S., M.Kortz, and J.Conners (2011). *DataZoo, an Information System*. Scripps Institution of Oceanography (SIO) Technical Report Series, University of California San Diego.

Donovan, J.M., and K.S.Baker (2011). *The Shape of Information Management: Fostering Collaboration across Data, Science, and Technology in a Design Studio*. Scripps Institution of Oceanography (SIO) Technical Report Series, University of California San Diego.

Pre-Ocean Informatics Technical Reports

Karasti, H., K. Baker, and G.C.Bowker (2003). Proceedings of the Computer Supported Scientific Collaboration Workshop (CSSC), Eighth European Conference on Computer Supported Cooperative Work (ECSCW), Helsinki, Finland, 14 September 2003. http://escholarship.org/uc/item/31m1m9qc

Baker, K.S., and H.Karasti (2004). *The Long-Term Information Management Trajectory: Working to Support Data, Science and Technology*. Scripps Institution of Oceanography (SIO) Technical Report Series, University of California San Diego. http://escholarship.org/uc/item/7d64x0bd

Papers and Proceedings

Karasti, H., and K. S. Baker (2004). Infrastructuring for the long-term: ecological information management. *Proceedings of the Hawai'i International Conference on SystemSciences* (HICSS) 2004, 5-8 January, Big Island, Hawaii, IEEE, New Brunswick, NJ, 2004.

Jackson, S. J., and K. S.Baker (2004). Ecological Design, Collaborative Care, and Ocean Informatics. *Proceedings of the Participatory Design Conference*, PDC-04, Vol 2.

Baker, K.S., S.J. Jackson, and J.R. Wanetick, 2005. Strategies Supporting Heterogeneous Data and Interdisciplinary Collaboration: Towards an Ocean Informatics Environment in *Proceedings of the 38th Hawaii International Conference on System Sciences (HICSS) 2005*, 3-6 January, Big Island, Hawaii, pp. 1-10, IEEE, New Brunswick, NJ.

Baker, K. S., and F. Millerand (2007). Scientific Information Infrastructure Design: Interdependent Provinces and Knowledge Environments. *Proceedings of the American Society for Information Systems and Technology Conference*. October 18-25, Milwaukee, Wisconsin.

Baker, K.S. and F.Millerand (2007). Articulation Work Supporting Information Infrastructure Design: Coordination, Categorization, and Assessment in Practice in *Proceedings of the 40th Hawaii International Conference on System Sciences*.

Baker, K.S. and K.I.Stocks (2007). Building Environmental Information Systems: Myths and Interdisciplinary Lessons *in Proceedings of the 40th Hawaii International Conference on System Sciences.*
Baker, K. S., and C. L. Chandler (2008). Enabling long-term oceanographic research: Changing data practices, information management strategies and informatics. *Deep Sea Research Part II*, *55*(18/19): 2132-2142.
Karasti, H. and K.S. Baker (2008). Community Design: Growing One's Own Information Infrastructure in *Proceedings of the Participatory Design Conference*. 30Sep-04Oct, 2008, Bloomington, IN.
Baker, K.S. and L.Yarmey (2009). Data Stewardship: Environmental Data Curation and a Web-of-Repositories. International Journal of Digital Curation 4(2):12-27.
Baker, K.S. and F.Millerand (2010) Infrastructuring Ecology: Challenges in Achieving Data Sharing. In *Collaboration in the New Life Sciences*. J.Parker, N.Vermeulen, and B.Penders (eds), Ashgate, Surrey, England: p. 111-138.

<u>Posters about Ocean Informatics</u>
Included are posters about the Ocean Informatics Initiative and Information Management. The abstracts with numbers as identifiers are given in Appendix 10. Posters are online: http://oceaninformatics.ucsd.edu/media-gallery/?id=1

10. Title: LTER Growing Information Infrastructure: Data Lifecycles and Subcycles
Author(s): Karen Baker, Florence Millerand, Lynn Yarmey
Date: 2009-09-14

20. Title: INTEROP Scientific Infrastructure Design: Information Environments and Knowledge Provinces
Author(s): Karen Baker, Florence Millerand
Date: 2007-10-19

24. Title: LTER Environmental Data Management: Infrastructure Studies Insights
Author(s): Florence Millerand and Karen Baker
Date: 2007-08-02

26. Title: LTER: Long Term Informatics
Author(s): KBaker, CChandler, AGold, FMillerand, JWanetick
Date: 2007-08-02

28. Title: LTER: Research in Infrastructure Studies: Social & Organizational Perspectives on Ecological Data Management
Author(s): Florence Millerand and Karen Baker
Date: 2006-09-20

33. Title: Initiating the Data Dialogue: 2005 CalCOFI Conference Interactive Poster
Author(s): Karen Baker
Date: 2005-12-06

34. Title: CalCOFI Data Management: Overview and Reflection
Author(s): Karen Baker, Karen Stocks
Date: 2005-12-05

<u>Pre-Ocean Informatics Publications</u>

Baker, K. S. (1996). Development of Palmer Long-Term Ecological Research Information Management in *Proceedings of Eco-Informa Workshop, Global Networks for Environmental Information, 4-7 November 1996, Lake Buena Vista, FL*, pp. 725-730.

Baker, K. S. (1998). Palmer LTER information management in *Data and information management in the ecological sciences: a resource guide (Proceedings of workshop, held at University of New Mexico, Albuquerque, NM, 8-9 August, 1997)*, pp. 105-110, 1998.

Baker, K. S., B. J. Benson, D. L. Henshaw, D. Blodgett, J. H. Porter and S. G. Stafford (2000). Evolution of a multisite network information system: the LTER information management paradigm. *BioScience*, *50* (11), 963-978.

<u>Other Information Management Articles</u>

The follow are articles from Databits, the LTER Information Management Committee Newsletter (http://databits.lternet.edu).

Author, Title, Newsletter Issue: Category

Baker, K.S., Palmer Field Work, 91Summer: News Bit
Baker, K.S., Software Tips, 92Fall: News Bit
Baker, K.S., Palmer Field Work, 92Spring: News Bit
Baker, K.S., Palmer Field Work, 92Fall: News Bit
Baker, K.S., Palmer Field Work, 93Summer: News Bit
Baker, K.S. , Palmer Field Work, 94Spring: News Bit
Baker, K.S., Technical Training, 99Fall: News Bit
Baker, K.S., Site Survey/Education Outreach/Good Read/Ecologist in the News, 99Fall: News
Baker, K.S. and M. White, LTER Newsletter Databits New Design, 99Spring: Feature
Baker, K. and J.Brunt , Site Information Manager-Network Office Exchanges, 99Spring: Feature
Baker, K. and J.Brunt, Database Design Tools, 99Spring: Feature
Baker, K.S., Electronic Multi-Authoring, 99Spring: Feature
Baker, K., LTER Site Description Directory Update, 00Spring: News
Baker, K., Information Manager Guide, 00Spring: FAQ
Baker, K., Online Computing Dictionary, 00Fall:, FAQ
Sheldon, W., Evolution of a Multisite Network Information System, 01Spring: Good Read Review
Baker, K., Moving Toward Network Identity, 01Fall: Feature
Baker, K., Ecology Through Time, 01Fall: Good Read
Baker, K., Biodiversity Data Diversity, 01Fall: Good Read
Baker, K., Managing Scientific Metadata, 02Spring: Good Read
Vernet, M. and K.Baker, Is it Time to Bury the Ecosystem Concept?, 02Spring: Good Read
Baker, K., SCI2002 Conference: Ecoinformatic Challenges at International Conference, 02Fall: News
Baker, K., Ecological Vignettes: A History of the Ecosystem Concept in Ecology, 02Fall: Good Read

Baker, K. and H. Karasti, Whirlwind Tour of Collaborative Practice, 03Spring: , Commentary
Baker, K., Information Ecology, 03Spring: Good Read
Baker, K., The Invisible Present, 03Spring: Good Read
Baker, K., BioScience January 2003 Special Issue LTER, 03Fall: Good Read
Baker, K., Steps Towards an Ecology of Infrasctructure, 03Fall: Good Read
Baker, K.S., S.R.Haber, and M.White, Postnuke Portal Software: Community, Content, and Collaborative Management System, 04Spring: Feature
Baker, K., Data Grids, Collections, and Bricks, 04Spring: Good Read
Jackson, S., The Dry and the Wet, 04Spring: Good Read
Baker, K., J.Wanetick, and S.Haber, The Cognitive Style of Powerpoint, 04Fall: Good Read
Campbell, C., Infrastructuring for the Long-term: Ecological Information Management, 04Fall: Good Read Review
Baker, K., Data at Work: Supporting Sharing in Science and Engineering, 04Fall: Good Read
Baker, K., L.Yarmey, L.Powell, and W.Sheldon, Designing a Dictionary Process: Site and Community Dictionaries, 05Spring: Feature
Baker, K., Atkins Report on CyberInfrastructure, 05Spring: Good Read
Baker, K.S., Revolutionizing Science and Engineering through Cyberinfrastructur, 05Spring:Good Read
Millerand, F., Building the Virtual State: IT and Institutional Change, 05Spring: Good Read
O'Brien, M., Strategies Supporting Heterogeneous Data and Interdisciplinary Collaboration: Towards an Ocean Informatics Environment, 05Spring: Good Read Review
Millerand, F., K.Baker, B.Benson, and M.Jones, Lessons Learned from EML about the Community Process of Standard Implementation, 05Fall: Feature
Haber, S. and K.Baker, Web Communication Strategies in a Collaborative Environment: Lessons Learned, 05Fall: Feature
Ribes, D., Incorporating Semantics in Scientific Workflow Authoring, 05Fall: Good Read
Yarmey, L. and K.Baker, The Meaning of Everything, 05Fall: Good Read
Baker, K., From Databases to Dataspaces: Opening up Data Processes, 06Spring: Good Read
Haber, S., Designing Interfaces, 06Spring: Good Read
Haber, S., Design Patterns: Elements of Reusable Object-Oriented Software, 06Spring: Good Read
Baker, K., L.Yarmey, S.Haber, F.Millerand, and M.Servilla, Creating Information Infrastructure through Community Dictionary Processes, 06Spring: Feature
Kortz, M., File Sharing Options: Elements of a Collaborative Infrastructure, 06Spring: Feature
Baker, K., Governance Working Group Proposes Updates to LTER By Laws, 06Spring: News
Yarmey, L., The Importance of Intertwingling, 06Spring: Good Read
Baker, K., D.Pennington, and J.Porter, Multiple Approaches to Semantic Issues: Vocabularies, Dictionaries and Ontologies, 06Spring: Feature
Yarmey, L., Ocean Informatics Matlab Working Group, Mirroring the LTER Community Approach, 06Fall: Feature
Kortz, M., Three Challenges in Supporting Shared Workspaces, 06Fall: Feature
Baker, K., Scientific Meetings: Rigor, Relevance, and Variety, 06Fall: Editorial
Millerand, F., NSF Workshop: History and Theory of Infrastructure. Lessons for New Scientific Cyberinfrastructures, 06Fall: News
Baker, K., Metadata: Implementation of an International Framework, 06Fall: Good Read
Gragson, T., Data Curation in E-Science, 06Fall: Good Read Review

Conners, J., Database Storage Model Considerations: XML and Relational Database Approaches 07Spring: Feature
Baker, K., J.Wanetick, N.Huffnagle, and M.Kortz, Information Infrastructure: Transitioning Directory Services, 07Spring: Feature
Haber, S., A Web Developer's View of the Research World and the Entertainment Industry, 07Spring: Feature
Kaplan, N., C.Gries, K.Baker, D.Henshaw, T.Valentine, and J.V.Castle, Information Management Committee: GIS, Technology, and Changing Organizational Structures, 07Spring: News
Millerand, F., On-going research collaboration-interoperability, 07Spring: News
Baker, K., Computer Systems Development: History, Organization and Implementation, 07Spring: Good Read
Grabner, S., Information Ecology: Open System Environment for Data, Memories and Knowing, 07Spring: Good Read Review
Baker, K. and J.Campbell, What is the rationale for publishing DataBits twice a year?, 07Spring: FAQ
Kortz, M., Web-Based Data Visualization With JPGraph, 07Fall: Tools
Conners, J., YUI: An Open-source JavaScript Library, 07Fall: Tools
Baker, K.S. and R.Thombley, Place, Location, and Geographic Conventions, 07Fall: Good Read
Yarmey, L., Figuring on Insight through an Insightful Figure, 07Fall: Good Read Review
Baker, K., Professional Learning Opportunities: Conferences, Meetings, and Mindsets, 07Fall: Feature
Conners, J. and M.Kortz, Developing and Using APIs in System Design, 08Spring: Feature
Baker, K. and S. Grabner, Big Science and Local Meetings, 08Spring: Commentary
Yarmey, L., Preservation Metadata: Another Chapter in the Metadata Story, 08Spring: Commentary
Yarmey, L., Data Quality: Yet Another Chapter in the Metadata Story, 08Spring: Commentary
Baker, K.S., Cyberinfrastructure Primer, 08Spring: Good Read
San Gil, I., Digital Data Practices and the Long Term Ecological Research Program, 08Spring:Good Read Review
Baker, K., Whirlwind Tour of Digital Curation in the UK, 08Fall: Commentary
Kortz, M., Getting Started with Web Services, 08Fall: Feature
Simmons, B. and J.Conners, Telling the Story Behind the Photos, 08Fall: Feature
Yarmey, L., Clutter is Failure of Design, 08Fall: Commentary
Conners, J., MySQL Workbench: A Visual Database Design Tool, 08Fall:Tools
Baker, K., Disputed Definitions, 08Fall: Good Read
Kaplan, N., Enabling Long-Term Oceanograhic Research, 08Fall: Good Read Review
Palfner, S., Cyberinfrastructure Travels: Sharing & Shaping Time, Space and Data, 09Spring:Feature
Petersen, R.I., Representing Geographic Features, 09Spring: Feature
Yarmey, L., Vocabulary Development as a Tool for Community-building, 09Spring: Feature
Baker, K., Pacific Coast Zooplankton Working Group: Data and Information Infrastructur, 09Spring: News
Kortz, M., Data at Work: Supporting Sharing in Science and Engineering, 09Spring: Good Reads
Baker, K. and M.Bietz, Informatics and the Electronic Geophysical Year, 09Spring: Good Read
Yarmey, L., Continuing Education Options for Information Managers, 09Fall: Commentary

Wiley, S., Firebug: Web Customizing To Fit Your Needs, 09Fall: Tools
Kaplan, N. and K.Baker, Experiences from an Information Management Cross-Site Visit, 09Fall: Feature
Conners, J., Matplotlib: An Open Source Python 2-D Plotting Library, 09Fall: Tools
Kortz, M., LTER Unit Registry: Products and Processes, 09Fall: News Bits
Baker, K., Identifying Best Practice and Skill for Workforce Development in Data Curation, 09Fall: Good Read
Yarmey, L., An Introduction to the Panton Principles for Open Data in Science, 10Spring: Feature
Baker, K. and J.Wanetick, SIO Ocean Informatics Update: Growing Infrastructure in Support of Scientific Research, 10Spring: Feature
Baker, K.S., Information Manager Extraordinary Teleconferences: An ET Moment, 10Spring: News Bits
Henshaw, D., Webs of users and developers in the development process of a technical standard, 10Spring: Good Read Review
Baker, K., Note on Category Formation, 10Fall: Feature
Conners, J., Addressing Scaling Associated with Data Access, 10Fall: Feature
Baker, K., N.Kaplan, and E.Melendex-Colom, IMC Governance Working Group: Developing a Terms of Reference, 10Fall: Feature
Yarmey, L., Transitions and Comparisons, 10Fall: Feature
Kortz, M., Enactment and the Unit Registry, 10Fall: Feature
Baker, K. and E.Melendez-Colom, Evolution of Collaboration in Ecology, 10Fall: Good Read
Baker, K.S. and N.Kaplan, Network Identity: 2009 All-Site Milestone and Governance Issues, 11Spring, Feature
Baker, K. and M. Kortz, LTER Information management: Continuing Education and Site Change, 11Spring, Feature
Baker, K., Collaborative, cross-disciplinary learning and co-emergent innovation in eScience teams, 11Spring, Good Read
Baker, K., A Special Issue of Science on Data, 11Spring, Good Read
Haber, S., Technical Roles: Am I In IT?, 11Spring, Commentary
Conners, J. ,Notes on Design. 11Spring, Commentary
Donovan, J., Making Space for Information Management, 11Spring, Feature
Kortz, M., Review: The PersonnelDB Design and Development Workshop, 11Spring, Feature
Baker, K., Information Management, Data Repositories and Data Curation. 11Spring, Commentary
Baker, K., Wordle: Application for Generating Text Visualization. 11Spring, Good Tools.

4 SIO Requests for Action

4.1 Appendix: SIO Time Capsule and Long-Term Data

Subject: SIO Centennial Time Capsule and Long-Term Data
Date: Mon, 16 Jun 2003 11:14:58 -0700
From: Karen Baker <karen@guardian.icess.ucsb.edu>
To: Kevin Hardy <khardy@ucsd.edu>
CC: ckennel@ucsd.edu, tcollins@ucsd.edu, lshaffer@ucsd.edu, evenrick@ucsd.edu, kbaker@ucsd.edu

Dear SIO Centennial Organizers,

The call for contributions to a Scripps time capsule is thought provoking:

> Subject: Re: [Ancient Mariners] Ancient Mariner eNews. May 2, 2003
> 7. Time Capsule contents suggestions needed, due 01 August 2003.
> On the Friday of our Centennial, two time capsules will start a journey
> for Scripps 50 and 100 years hence. .The big question is: What . do
> you think we should send along to our academic descendants? Send
> an e-mail with subject "Time Capsule" to Kevin Hardy <khardy@ucsd.edu>.

A time capsule reaches back into an institution's past, displays the institution's present and reaches forward toward its own future. Historical data and interpretation of those data interact in distinctly different ways with future scientists. Persistent relevance is a hallmark of the long-term data sets and time series needed to understand environmental change. Scripps is renowned for such seminal work and irreplaceable data, e.g. C D Keeling's atmospheric CO2 data, SIO pier time series, the CalCOFI and Santa Barbara Channel data sets. Including some of Scripps's noteworthy data in the time capsule would not only represent one of the Institution's most salient contributions to contemporary science, but would also preserve those data through the ensuing century.

Preparation of data for long-term preservation is a critical though often overlooked and underestimated task. In addition, providing access to the data is as important as providing the data themselves. If the time capsule recipients no longer have the means to convert a DVD to their contemporary presentation mode, the data will effectively be lost. Therefore, a "modern" presentation of data could be coupled with a visual presentation on a durable medium, such as paper. Perhaps the Keeling Curve warrants a Rosetta stone and an accompanying contemporary volume of contentious discussions surrounding the Kyoto Protocol.

We suggest an invitation be issued to the SIO community for contributions of selected long-term datasets, along with their stories, to be included into the time capsule.

-Karen Baker, Jerry Wanetick, Dawn Rawls
SIO Integrative Oceanographic Division

4.2 Appendix: Response to SIO Director Search Request

SIO Director Search 2006

A request was made to the faculty and staff prior to the search for a new director of SIO in 2006. Below is the response sent by an Ocean Informatics participant influenced by the notions of infrastructure, sociotechnical, and long-term.

Comment
In a new director I would look for an awareness and commitment to developing and supporting new interdisciplinary data practices, information interfaces, and learning environments; someone who knows the difference between information science and information technology and can create a balance that bridges to the scholarship of information studies and information systems design. As we face the challenges of developing new approaches to both long-term local endeavors and connectivity to global collaborative programs, data and knowledge management - frequently lumped under the cyberinfrastructure banner today - are traditionally underdeveloped, narrowly defined, and organizationally unrecognized.

Specific Recommendations
1. In the SIO search process seek an individual with an openness, sensitivity, and/or understanding of information stewardship and information infrastructure as part of their vision for contemporary scientific work.

2. Consider informatics, information management, and data stewardship as additional 'alternative' categories.

-Karen Baker
Palmer Station and California Current Ecosystem Information Manager
Long-Term Ecological Research Program (PAL, CCE LTER)
Ocean Informatics Initiative, Integrative Oceanography Division

5 Appendix: Ocean Informatics Reading Groups

OI held Reading Groups from 2003 to 2010. The purpose of a reading group is to foster conceptual development, create mental frameworks, and broaden perspectives through shared readings. Reading group characteristics include meeting regularly over time to stimulate dialogue, generate shared experiences, and build common vocabulary."

1. Summer Informatics Reading Group 2010

15 Jul 2010
KSBaker and FMillerand, 2010. Infrastructuring Ecology: challenges in achieving data sharing. In *Collaboration in the New Life Sciences*. J.Parker, N.Vermeulen, and B.Penders (eds).
http://interoperability.ucsd.edu/docs/10BakerMillerand_infrastructuringEcology.pdf

23 Jul 2010
GCFox and DGannon, D.,2006. Special Issue: Workflow in grid systems. *Concurrency and Computation: Practice and Experience,* 18(10), 1009-1019.
http://dx.doi.org/10.1002/cpe.1019

TOinn, MGreenwood, MAddis, MNAlpdemir, JFerris., KGlover et al., 2006. Taverna: lessons in creating a workflow environment for the life sciences. *Concurrency and Computation: Practice and Experience*, 18(10), 1067-1100.
http://dx.doi.org/10.1002/cpe.993

30 Jul 2010
Char Booth, In The Library with the Lead Pipe, July 21, 2010.
http://www.inthelibrarywiththeleadpipe.org/2010/librarians as ___:
shapeshifting-at-the-periphery/

John Graybeal, The Good Enough System, July 11, 2010.
http://marinemetadata.org/blogs/graybeal/the-good-enough-data-system

Chris Rusbridge, Semantic Web of Linked Data, July 24, 2009.
http://digitalcuration.blogspot.com/2009/07/semantic-web-of-linked-data-for.html

06 Aug 2010
IHacking, 1983. The creation of phenomena. (Chapter 13) In Representing and Intervening: Introductory Topics in the History of Natural Science. Cambridge University Press, Cambridge. p220-232.

HSBecker, 1986. Telling about society. (Chapter 7). In Doing things together: selected papers. Northwestern University Press. Evanston, Illinois. P121-135.

13 Aug 2010
LManovich and JDouglass, 2009. Visualizing Change.

http://lab.softwarestudies.com/2008/09/cultural-analytics.html

LManovich, Software Takes Command, 2008. In There is Only Software. http://lab.softwarestudies.com/2008/11/softbook.html)

LManovich, 2007. Databases as a symbolic form. In New Media. http://con.sagepub.com/content/5/2/80.full.pdf+html

20 Aug 2010
RTomako, 2004. How I Explained REST to My Wife; http://tomayko.com/writings/rest-to-my-wife

AMiles, 2009. REST-not-so-easy? Data-Sharing Networks and the Atom Publishing Protocol. http://alimanfoo.wordpress.com/2009/12/15/rest-not-so-easy-data-sharing-networks-and-the-atom-publishing-protocol/

DHinchcliffe, 2008. What Is WOA? It's The Future of Service-Oriented Architecture (SOA) http://hinchcliffe.org/archive/2008/02/27/16617.aspx

27 Aug 2010
EAronova, KBaker, and NOreskes, 2010. From the International Geophysical Year to the International Biological Program: Big Science and Big Data in Biology, 1957-present. Historical Studies in the Natural Sciences 40(2): 183-224. http://interoperability.ucsd.edu/docs/10AronovaBakerOreskes_HNS.pdf

3 Sep 2010
Latour, B. (1992). Where are the Missing Masses? Sociology of a Few Mundane Artefacts. In W. Bijker and J. Law (Eds.) Shaping Technology, Building Society: Studies in Sociotechnical Change. Cambridge, Mass, MIT Press: 225-258. http://spiral-ulg.be/cours/STS_09-10/Lectures/11-03_Séance%20D/LATOUR%20%281992%29_The%20Missing%20Masses.pdf

2. Summer Informatics Reading Group 2009

Memorable Quote: “The thing about this group is it’s a technology group that doesn’t think technology is the answer.”

18 Jun 2009
JBirnholtz and MBietz, 2003. Data at Work: Supporting Sharing in Science and Engineering. Proceedings of the ACM Conference on Supporting Group Work, Sanibel Island, FL, November 9 – 12, 2003.

30 Jun 2009
DNBaker, WKPeterson, and PFox, 2008. Informatics and the 2007-2008 Electronic Geophysical Year. EOS 89(48): 485-500.

14 July 2009
JGrudin, 1988. Why CSCW Applications Fail: Problems in the Design and Evaluation of Organizational Interfaces. Proceedings of the 1988 ACM conference on Computer-Supported Cooperative Work: 85-93, ACM Press New York, NY, USA.

04 Aug 2009
BRZeeberg, JRiss, DWKane, KJBussey, EUchio, WMLinehan, JCBarrett, JNWeinstein, 2004. BMC Bioinformatics 5:80.

SVeretnik. JLFink, PEBourne, 2008. Computational Biology Resources Lack Persistence and Usability. PLoS Computational Biology 4(7). http://www.ploscompbiol.org

09 September 2009
Lee, C., Dourish, P., and Mark, G. 2006. The Human Infrastructure of Cyberinfrastructure. Proc. ACM Conf. Computer-Supported Cooperative Work CSCW 2006 (Banff, Alberta), 483-492. //www.dourish.com/publications/2006/cscw2006-cyberinfrastructure.pdf

3. Ocean Informatics Reading Group 2005

This group re-emerged recently in response to the recognition of the benefits of integrating, reflecting, exploring, articulating, and dialoguing (iREAD!) on new perspectives enabled by contemporary information science and technology. The emerging plan is to meet monthly and to identify strategic design teams or working groups to pursue topics of immediate interest to the community. Occasional guest authors of papers will be invited.

March 14, 2005 - Semantics of the Web
Tim Berners-Lee, JHendler and OLassila, 2001. The Semantic Web. Scientific American 0501:35-43.

6 April 2005 - Marine Metadata
RLRiali, FMarincioni, and FLLLightsom, 2004. Content Metadata Standards for marine Science. USGS Report 2004.
http://pubs.usgs.gov/of/2004/1002/images/pdf/site.pdf

Related Links:
MRIB System: http://mrib.usgs.gov/
MRIB Metadata: http://mrib.usgs.gov/meta/
MRIB Controlled Vocabulary: http://mrib.usgs.gov/controlled_vocabulary/

11 May 2005 – Ontologies: A Learning Trajectory
DRibes and GCBowker, submitted. A Learning Trajectory for Ontology Building (2009). Between meaning and machine: learning to represent the knowledge of communities. Information and Organization 19(4):199-217.)
http://interoperability.ucsd.edu/docs/09RibesBowker_Inf&Org.pdf

21 June 2005 – Information Ecologies

Thomas Davenport, 1997. Information and Its Discontents: An Introduction. Chapter 1 in Information Ecology, Oxford University Press.

26 July 2005 – Information Exchange
PCornellian, JGallagher, TSgouros, 2003. OpenDAP: Accessing Data in a distributed, heterogeneous environment. Data Science Journal 2: 159-169.

PCornellian, 2005. What Is a Data System, Anyway? Educause Review, March/April 2005, p.10-11.

4. Information Studies Reading Group 2004-2005

This group began Fall Quarter 2004 as a collaborative learning mechanism for the Comparative Interoperability Project. Readings explore sociotechnical and human dimensions of information systems, data and information management. Participation includes Interoperability project participants, UCSD and SIO staff as well as students. Guest authors of papers will be invited occasionally.

18 Nov 2004, 6-8pm
JFountain, 2001. Build the Virtual State: Information Technology and Institutional Change [chapters 1 (p3-17), 2 (p.18-30), 7(p.107-128), 11(p193-206) + footnotes]

Two factors of immediate interest: the distinction between objective technology and enacted technology as well as the collection of interesting case studies. Although the focus is on organizations (projects with goals/products) within institutional cultures (govenments with processes/rules), the organizationinstitution distinction becomes less distinct in university settings where the project can be the organization within the university institution while simultaneously the university can be the organization within the NSF institution. Pertinent to those working with national computational centers, there is a lack of application of the objective-enacted distinction at the time of software development. Because the author tended to lump technical with objective and social with enacted, we were prompted into a lively discussion of how the technical was relevant in the enacted phase and the social in the objective phase.

09 Dec 2004, 6-8pm
Atkins Report, 2003. Revolutionizing Science and Engineering Through Cyberinfrastructure. NSF Blue-Ribbon Advisory Panel on Cyberinfrastructure (http://www.communitytechnology.org/nsf_ci_report). -Foster, Kesselman,

Tuecke: The Anatomy of the Grid, 2001 (http://www.globus.org/research/papers/anatomy.pdf)

Internet Computing and the Emerging Grid, 2000 (http://www.nature.com/nature/webmatters/grid/grid.html) The Atkins report three chapters total just over 100 pages and is not particularly dense. To direct our efforts read Appendix A and C but skip/skim the other appendices.] So what is this new beast "cyberinfrastructure"? It's related to the grid-eScience for which we have two overview papers for background.

13 Jan 2005, 6-8pm
MCallon and BLatour, 1981. Unscrewing the Big Leviathan: how actors macrostructure reality and how sociologists help them to do so. Advances in Social Theory and Methodology: Toward an Integration of Micro- and Macro-Sociologies. K.Knorr-Cetina and A.V.Cicourel. Boston, Mass, Routledge

S.S. Strum and B. Latour,1987. Redefining the social link: from baboons to humans. Social Science Information 26(4):783-802

B. Latour, 1992. Where are the Missing Masses? The Sociology of a Few Mundane Artifacts. In Shaping Technology, Building Society: Studies in Sociotechnical Change. edited by Weibe E. Bijker and John Law, 225-258. Cambridge, MA: MIT Press

Moving from grand theories of society (structure) and the ethnomethodological highlight of everyday work of construction and negotiations to actor network theory with the origins and manifestations of power emerging from a blend of structure and process, the Latour readings bring focus to 'the experts' and to extending our language resources to include social (meaning to associate), macroactors, leaky black boxes, translation, negotiation, technomorphism, and obligatory passage points (OPP). These papers present Latour's sociotechnical ponderings on the concept of macro-actors, performative/negotiated social arenas, and prescriptive elements. So do we understand what part such perspectives, roles, and the 'distribution of competence' play in social science in general and in our work in particular? And can we see where technology (or technological artifacts) contribute to the shaping of society as the process of simplification occurs, the taking of the complex to the complicated in order to make it durable?

10 Feb 2005, 6-8pm
SLStar, Power, technology and the phenomenology of conventions: On being alergic to onions, in A Sociology of Monsters: Essays on Power, Technology and Domination

Star, 1989, Institutional Ecology, "Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39

Abbate, J. (1999). Inventing the Internet. Cambridge, MA, MIT Press Introduction (6p) and Chp5: The Internet in the International Standards Arena (34p)

Other/support readings:
Star, 1990, The Structure of Ill-Structured Solutions: Boundary Objects and Heterogeneous Distributed Problem Solving, in Distributed Artifical Intelligence, vol2, Morgan Kaufman Publishers, Inc

Star and Bowker, 2002, How to Infrastructure, in Handbook of New Media, LA Lievrouw and S Livingstone (eds), London, Sage Publications

Star and Strauss, 1999, Layers of Silence, Arenas of Voice: The Ecology of Visible and Invisible

Work, Computer Supported Cooperative Work 8:9-30

Abbate, Inventing the Internet Chp1: White Heat and Cold War: The Origins and Meanings of Packet Switching Chp2: Building the ARPANET: Challenges and Strategies Chp3: The Most Neglected Element: Users Transform the ARPANET Chp4: From ARPANET to Internet Chp5: The Internet in the International Standards Arena Chp6: Propularizing the Internet

10 Mar 2005, 6-8pm
TAFinholt, 2004. Collaboratories. In Annual Review of Information Science and Technology. E B. Cronin (ed)

GM Olson and JS Olson, 2000. Distance Matters Human-Computer Interaction 15:137-178

SS Hale, AHMiglarese, MP Bradley, TJBelton, LDCooper, MTFrames, CAFriel, LMHarwell, REKing, WKMichener, DTNicolson, BGPeterjohn, 2003; Managing Troubled Data: Coastal Data Parnerships Smooth Data Integration. Environmental Monitoring and Assessment, Kluwer Academic Publishers 81: 133-148

14 April 2005, 6-8pm; guest Susan Sim
Author Susan Sim will join us for a phone conference discussion.

Technical: SSim, SEasterbrook and RHolt, 2003. Using Benchmarking to Advance Research: A Challenge to Software Engineering in Proceedings, 25th International Conference on Software Engineering, Portland, Oregon, May, 2003

Social: JO'Connell, 1993. Metrology: The Creation of Universality by the Circulation of Particulars Social Studies of Science 23(1): 129-173. (pdf)

19 May 2005, 6-8pm; guest David Obstfeld
KEWeick, KMSutcliffe and DObstfeld, in press. Organizing and the Process of Sensemaking - Projects and Routines: Toward A More Concrete Specification of the Exploration-Exploitation Perspective. in preparation. Author David Obstfeld will join us for a phone conference discussion.

K.E.Weick, K.M.Sutcliffe, and D.Obstfeld, Organizing and the process of sensemaking. Organization Science, 16(4), 409-421

28 June 2005, 6-8pm
Amit Sheth, Changing Focus on Interoperability in Information Systems: from System, Syntax, Structure to Semantics in Interoperating Geographic Information Systems. Goodchild, Egenhofer, Fegeas, Kottman (1999)

5. Science Studies Technology Reading Group 2003-2004

This group met as an offshoot of the UCSD Science Studies Program under the guidance of Geoffrey Bowker (past Chair of the UCSD Communication Department and current Director of the Center for Science, Technology and Society at Santa Clara University).

Memorable Quote: A 'perspicacious object' is something that illustrates, provokes, challenges or otherwise opens up the question of technology in interesting ways.

08 Oct 2003
Italo Calvino - Six Memos for the Next Millennium, 1987

05 Nov 2003
Participants - Perspicacious Objects
Leo Marx, 1994. The Idea of Technology and Post Modern Pessimism. In Does Technology Drive History. MSmith and LMarx, eds, pp237-257.

04 Dec 2003
David de Leon - Building Thought Into Things, 1999
Ernest Boesch - The Sound of the Violin

21 Jan 2004
Dava Sobel - Galileo's Daughter, 1999 (Chp 4, 5, & 28)
M.G.Winkler and A.Van Helden, 1992. Representing the Heavens: Galileo and Visual Astronomy. Isis 83(2): 195-217.

19 Feb 2004
Bruno Latour - Paris, Invisible City; http://www.bruno-latour.fr/virtual/index.html

18 Mar 2004
Donald MacKenzie- Mechanizing Proof: Computing, Risk and Trust, 2003
Chp 2: Boardwalks Across the Tar Pits
Chp 9: Conclusion: Logics, Machines and Trust

20 May 2004
Kevin Warwick- March of the Machines, 1997
Chapter 1: In the Year 2050
Chapter 8: The Reading Robots -- An Overture
Chapter 9: Our Robots Today
Chapter 10: What Next With the Robots?
Chapter 11: A Fantastic Future?

6. Ocean Informatics Reading Group Discussion 2003

Discussion began about forming a group drawing on the SIO Integrative Oceanography Division interdiciplinarity and the Long-Term Ecological Research Program information management “community-of-practice”. The reading group purpose is to discuss articles about data, information management, information systems, and informatics topics with the explicit aim of exploring and learning to communicate about the concepts of information management, the Ocean Informatics Initiative, and an information environment.

December 2003. Take Back the Net. PC Magazine.
http://www.pcmag.com/article2/0,4149,1400257,00.asp

6 Appendix: Ethnographic Research

6.1 Appendix: What do you mean by 'social'? An imaginary dialogue between a social scientist and an ecological scientist

What do you mean by 'social'? An imaginary dialogue between a social scientist and an ecological scientist
By Florence Millerand, February 2006

The Ecological Scientist (ES): I've heard that you're involved in LTER as a social scientist. I'm curious, what kind of research do you do exactly?

The Social Scientist (SS): As a social scientist, I'm generally interested in the study of social behavior and social arrangements. I'm particularly interested by the study of scientific communities (like the LTER community) and technological development, as results of human and social activities.

Currently, I work on a project about technologies that enable the exchange of data among scientists (we call cyberinfrastructures or large-scale information infrastructures). We compare three scientific communities, each tries to resolve the challenge of data sharing in their own way. In doing so, we do not merely concentrate on the chosen technical solution but also consider the often overlooked but crucial social and organizational dimensions of such technological projects.

ES : Sounds interesting. But I think I didn't get all the concepts. Could you be more specific about what you look at when you say 'social and organizational dimensions of technological projects'? And, I'd like to add, what's the scientific purpose of your research?

SS : Let me begin first with a answer to your last question: what do we do this research for? The scope of my research consists of providing a better understanding of the *organizational complexity* of scientific cyberinfrastructure projects. One possible outcome is a better understanding of the changes and challenges associated with the development of these large-scale information infrastructures. We hope our findings will be useful to both communities we study and other communities with similar technological projects.

ES: It's good if it's useful ☺. So when you talk about organization, for me organization refers to structure, shelves, classification… and social refers to groups (and parties ☺). For instance in ecology, 'social' species are the ones that are organized in colonies as opposed to disseminated species, spread individually…

SS: Well, you're right, that's what these words can mean, but the way we use them is different. What we understand under organization is human association, for example groups of researchers or structured communities.

As for social, I agree, it's a fuzzy term that can mean many things. Actually even if it's a crucial category in social sciences, its meaning is difficult to capture because it may not be directly observable and visible. Basically, what we understand by social is human and group interactions and the results thereof. For example, science is a social production. It implies informal as well formal interactions between individuals, groups, and institutions.

So that's what we study, these interactions and ties.

ES: So how is social different from organizational?

SS: Good point. They overlap but they remain distinct concepts. For example, when you implement a new communication technology in a research institution, for example e-mail, you may look at the consequences at the organizational level (what may affect the hierarchy, allocated resources, and policies) and at the social level (how the researchers' identities, working practices, and relationships are changed).

ES: I think I get it, so the organizational is like the structure, the formal stuff, whereas the social is more human and informal?

SS: Yes kind of. Let's say that the organizational is what is the most visible, and the social the often invisible or unexpressed.

ES: Why is it important to study something invisible and unexpressed?

SS: Well, because of our background as social scientists, we know that this invisible stuff is critically important, for instance when we try to understand the impact of technological change. Let me give you an example. When an assembly line is introduced into a factory, the work efficiency may increase. But at the same time, the informal communication and relationships that were important sources of motivation for the workers in the former shop may be lost. A new technology always comes with the new working practices that fit it, and with the organizational structure that supports the whole. In this case, informal communication didn't fit the new organization of working practices associated with the assembly line. As a consequence, it may increase workers discontent that may translate to loss of productivity, strikes, and so on.

ES: Ah interesting.

SS: From this example, we draw that this technical thing, the assembly line, is in fact sociotechnical: it consists of technical as well as social components that are intertwined.
In our research about cyberinfrastructures, we assumed that these technological projects were also sociotechnical in nature. The interoperability strategies that are put in place by the different communities require the simultaneous mobilization of community, technical and organizational resources. Because all these components are tied together, I talk about *configurations* of communities, technologies and organizations.

ES : You say 'configuration' because the communities, technologies, and organizations you talk about may be organized differently from a cyberinfrastructure project to another?

SS: Right. The three communities we study choose different approaches to achieve data interoperability, each of which is a configuration of a specific technology with specific communities in specific organizational arrangements.

ES: Understood. So why is your work so important?

SS: Well, the problem is: most of the time, these cyberinfrastructure projects are considered as technical issues (what would be the most suitable technology to achieve data interoperability) while in fact, such large-scale projects imply also important underestimated challenges at the social and organizational levels which may result in significant delays, costs, or frustrations.

ES: I think I get it. So, since I'm involved with LTER, and since we have adopted the EML specification as our metadata standard, I was wondering, what do you think of it?

SS: What we've noticed is that this strategy implies that the LTER researchers describe their datasets using EML, which represents a significant investment (of time, resources…) without an immediate benefit. In this case, the technology might seem good but implies a big burden upon the shoulders of your information managers. And what to say about the difficulty of convincing the researchers that the required investment is worth making since nothing in the current system rewards them in the short run?

Another problem in the long run is that the standard itself needs maintenance over the years. This requires a certain level of expertise, skilled people whose time has to be dedicated to work on the standard sustainability. But, the experts who have developed the standard are now working on other projects, and LTER information managers have enough work enacting the standard across the network. Who is going to take this job and the responsibility that goes with it? The organizational challenges are far reaching and might impact the very existence of the infrastructure in the long term.

Further, putting the standard into practice may imply some changes in the way scientific data are recorded and managed at the labs and research stations inside the community. When can a special measurement unit that has been created at a specific research station be acknowledged as a special unit or recognized as an LTER unit?

To conclude, the enactment of the EML standard in LTER and more broadly in the ecological research community comes with the transformation of the daily practices and organization of ecological science.

I hope this is helpful to understand what we're doing.

ES: It was helpful, thank you. So, what is the link between social and party again ☺?

6.2 Appendix: Ethnographic Field Hand-outs

March 2007

Ethnographic Fieldwork and Infrastructure Studies

Florence Millerand and Karen Baker

Project: Interoperability Strategies for Scientific Cyberinfrastructure: A Comparative Study
Project Web Page: http://interoperability.ucsd.edu
NSF Program(s): Scientific Testbeds; Human Social Dynamics: Agents of Change
NSF URL: http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0433369

We ask: How are data going to be made available…and widely usable? How will infrastructure and information systems be built to support data sharing?

Our goal: Comparative analysis with the goal of identifying features and facets of collaborative communities working on issues of interoperability.

This project explores the centrality of collaborative, interdisciplinary work in building information infrastructure. As new scientific infrastructure is emerging, a central question being posed is how to share data across time and across distributed organizational and social contexts. This issue is particularly important since some of the great political questions of our day, such as understanding climate and developing a sustainable relationship with our environment, depend upon the ability to federate data across organizational and disciplinary contexts. There have been a wealth of suggestions for technical fixes for this pressing concern, but there has been little study - and no comparative study - of the organizational and social dimensions of differing data handling and integration strategies.

As contemporary scientific questions increase in scope, conceptual and methodological frameworks must also broaden. Our project brings together a collaborative interdisciplinary team to address jointly selected contemporary cyberinfrastructure issues focusing on local practices and technology use that supports long-term scientific endeavors. We are looking simultaneously at the interdependent technical, organizational, and social processes involved in informatics and information system design including classification strategies, organizational structures, and ways of working as well as participant roles and responsibilities.

Through comparative study of three scientific communities - GEON, LTER, and Ocean Informatics - we seek to develop a grounded understanding of the complexities involved in producing and sustaining a shared scientific information infrastructure. Our methods draw from qualitative research - and include grounded theory, action research, design and sociotechnical analysis as well as systems and information science approaches. We conduct ethnographic analysis on documents and interviews; we use collaborative design in order to consider and facilitate interfaces with and between data, technology, and participants. Through design and articulation work such as community dialogue and mutual learning, we focus on building awareness of configurations and ramifications of technology use in today's scientific data handling arena.

Our work blends research and application, stretching from theory to enactment. While conducting infrastructure research, **we are sensitizing informatics, environmental science, and science studies communities to the need to consider in partnership the social and organizational dimensions of local work practices together with the technological**.

Project References:

KSBaker, DRibes, FMillerand, GCBowker, 2005. Interoperability Strategies for Scientific Cyberinfrastructure: Research and Practice. Proceedings of the American Society for Information Systems and Technology http://interoperability.ucsd.edu/docs/05ASIST_CIP_wbox.pdf

August 2006

Ethnographic Fieldwork and Design Studies

Karen Baker, Brian Lindseth, and Florence Millerand

Project: Interoperability Strategies for Scientific Cyberinfrastructure: A Comparative Study
Project Web Page: http://interoperability.ucsd.edu
NSF Program(s): Scientific Testbeds; Human Social Dynamics: Agents of Change
NSF URL: http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0433369

We ask: How are data going to be made available…and widely usable? How will infrastructure and information systems be built to support data sharing?

This project explores the centrality of collaborative, interdisciplinary work in building cyberinfrastructure. As new scientific infrastructure is emerging, a central question being posed is how to share data across time and across distributed organizational and social contexts. This issue is particularly important since some of the great political questions of our day, such as understanding climate and developing a sustainable relationship with our environment, pivot on the ability to federate data across organizational and disciplinary contexts. There have been a wealth of suggestions for technical fixes for this pressing concern, but there has been little study - and no comparative study - of the organizational and social dimensions of differing data handling and integration strategies.

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Through comparative study of three differing scientific communities: GEON, LTER, and Ocean Informatics, we seek to develop a grounded understanding of the complexities involved in producing and sustaining a shared scientific information infrastructure. Our methods draw from qualitative research - and include: grounded theory, action research, design and sociotechnical analysis, as well as systems and information science approaches. We conduct ethnographic analysis jointly on documents and interviews; we use collaborative design in order to facilitate interfaces with and between data and technology. Through design and articulation work including community dialogue and mutual learning, we focus on building awareness of configurations and ramifications of technology in today's scientific data handling.

Our work blends research and application, reaching from theory to enactment. **While conducting infrastructure research, we are sensitizing informatics, environmental science, and science studies communities to the need to consider in partnership the social and organizational dimensions of local work practices together with the technological**.

Project References:
KSBaker, DRibes, FMillerand, GCBowker, 2005. Interoperability Strategies for Scientific Cyberinfrastructure: Research and Practice. Proceedings of the American Society for Information Systems and Technology. http://interoperability.ucsd.edu/docs/05ASIST_CIP_wbox.pdf

July 2004

Introduction to the Ocean Informatics Project

Karen S. Baker, Steven Jackson, Jerry R. Wanetick

In recent decades, changes in the nature and practice of ocean science have driven (and in some cases, been driven by) parallel shifts in the information technology and computational landscapes. But there have been as yet few scholarly attempts to explore the intersection of these two worlds, and fewer still examining these dynamics in concrete organizational settings. The Ocean Informatics Project, based in the Integrative Oceanography Division (IOD) at the Scripps Institution of Oceanography (SIO), joins ocean, information, and social scientists in a collaborative effort to design adaptive and scalable information systems suitable for supporting the diverse work worlds of integrative ocean science. The success of larger-scale collaborative efforts depends upon facilitation of communication and data handling as well as upon a supportive technical, organizational, and social infrastructure.

Research during the initial phase of the project draws heavily on interviews and participant observation conducted with members from across IOD and related communities, ranging from PIs to information managers, graduate researchers and administrators. Such ethnographic field work places emphasis on identifying past and current work practices, with a particular focus on shifting patterns of data collection, use, sharing, and storage. Subsequent phases of the project will draw on initial findings and employ participatory, collaborative design methods developed in the social sciences to support the growth of locally-appropriate innovation strategies responsive to changes in the real-world data practices of ocean science.

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Karen Baker is an information manager at SIO at UCSD working with the Long-Term Ecological Research Program's Palmer Station site and the California Coastal Ecosystem site. Her research has ranged from bio-optical oceanography to informatics, and more recently from cooperative scientific work to collaborative systems design. She can be reached at kbaker@ucsd.edu, tel: 858-534-2350.

Steven Jackson is a doctoral candidate in the Department of Communication and the Science Studies Program at UCSD, and a doctoral fellow at Harvard University's National Center for Digital Government. His dissertation research explores the work of computer modeling and water policy in the American Southwest and U.S.-Mexico border region. He can be reached at sjjackson@ucsd.edu, tel: 858-452-8056.

Jerry Wanetick, director of the IOD Computational Center at SIO, provides support for long-term physical oceanographic studies through information system administration, data management, and cyberinfrastructure design. His work ranges from design and field deployment of data acquisition systems including remote sensing and wireless to a current focus on creating a working environment for information systems development. He can be reached at jwanetick@ucsd.edu, tel: 858-534-7999.

Team members Charleen Johnson (Logistics and Transcription), Dawn Rawls (Science Editor and Informal Education), Beth Simmons (Education and Outreach) and Shaun Haber (Computational Infrastructure and Collaborative Tools) add breadth and depth to Ocean Informatics endeavors.

6.3 Appendix: Interview questions

Interview Outline (for Data/Information managers)
JUNE 15, 2008

1. What is your job here at Scripps?
2. What roles does that imply?
3. How long have you been working at Scripps?
4. How has your job evolved during that time?
5. What is your relationship with the scientists?
6. What is your role with data? How do you interact with it?
7. How would you define interoperability?
8. According to you, what could be described at infrastructure in this project?
9. Can you define Ocean Informatics?
10. What are the objectives associated with OI?
11. What are the main challenges OI needs to face?

6.4 Appendix: Memos on Grounded Theory

Two memos summarize and reflect on the grounded theory approach.

Grounded theory: analytical process and comparison with other similar approaches
By Claude Arsenault

What is grounded theory?

Grounded theory is a qualitative analysis method. Its goal is to build theories concerning the structure and constancy of social phenomenon which have rarely been studied before. It is based on the comparison of different instances of a certain phenomenon. It does not try to achieve description of the phenomenon.

Its particularity lies in the fact that it tries to provide a valid account of the social phenomenon by using legitimate systematic analysis methods and a well chosen data sample. The broadness of the sample will not, however, allow the researcher to verify his theory. The main goal of grounded theory is to create or suggest a new theory, which explains that, throughout the sampling, the researcher will look for theoretical sufficiency rather than empirical sufficiency. Theoretical sufficiency can be defined as the integration, in the theory which is being built, of all the instances of the social phenomenon. Using this method, the sampling will stop when the new incidents found do not permit the researcher to identify different incidents.

Grounded theory is based on two main methodological principles. The first one, which originated in American pragmatism, states that a phenomenon must be grounded in its context to be studied properly. It therefore justifies the use of *in situ* observation as to make changes and processes more obvious. The second principle came from phenomenological philosophy. According to this principle, in order to build the theory, the researcher must put aside all pre-existing literature and data relative to the phenomenon he is studying. The concepts and hypotheses must be built as the research progresses.

The process of grounded theory is systematized and clearly defined. Its main steps are included in the codification, which is the core of continuous comparative analysis. Codification itself can be divided in three levels, between which the research will constantly be alternating. Each level brings a higher integration and greater delimitation.

Another key concept of grounded theory lies in theoretical sampling. The sampling in this type of research is based on the research question. Its goal is to be representative conceptually rather than statistically. It needs to reflect all the possible instances of the phenomenon under study. Theoretical sampling following the same general levels as codification and stops when theoretical sufficiency is achieved.

Reference: Lapierre, A. (1997). La théorisation ancrée (grounded theory): démarche analytique et comparaison avec d'autres approches apparentées. In J. Poupart, Deslauriers, Groulx, Laperrière, Mayer & Pires (Eds.), La recherche qualitative. Enjeux épistémologiques et méthodologiques (pp. 309-340). Boucherville, QC Gaétan Morin Editeur.

Grounded Theory Method
By Brian Lindseth
060520

Definition:
Grounded theory represents one type of qualitative analysis with underlying assumptions regarding development of theory usually emerging concurrently with field research and based on data (experiential, participative, documents). Analytic operations involve data collecting, theoretical coding and memoing. The method aims for rigor through systematicity of coding, iterative development of categories from data-analysis work, and comparative analysis. Grounded theory is a label and a literature with key concepts including theoretical sampling and theoretical selection or sensitivity as distinct from empirical selection. Need for explictness in methods, object of study, and level of abstraction (descriptive to general theory) eventually adopted.

Related concepts: qualitative analysis, theoretical sampling, theoretical coding, theoretical sensitivity, constant comparative method

References:
1. Strauss, Anselm L. Qualitative analysis for social scientists
Cambridge, Cambridge University Press, 1987.

2. Strauss, Anselm L. and Juliet Corbin. Grounded Theory Methodology: An Overview. In Norman Denzin and Yvonna Lincoln (Eds.) Handbook of Qualitative Research. p273-285, Thousand Oaks, CA, Sage Publications, 1994.

3. Glaser, Barney G.
Title Theoretical sensitivity in Advances in the methodology of grounded. Chap 3.
Publisher Mill Valley, CA, Sociology Press, 1978.

4. Historical
1967 Glaser & Strauss, Discov of Grounded Theory: Strategies for Qual Research
1990: Strauss & Corbin, Basics of Qualitative Research
1997: Strauss & Corbin, Grounded Theory in Practice

Grounded Theory

General
Grounded theory specifies an approach in which the analyst remains 'close' to the social world that is the object of investigation. Theory emerges out of an analyst's engagement with the world being studied in a process of continuing interaction and revision. Founded by Anselm Strauss and Barney Glaser, grounded theory is defined against the kind of speculative theorizing characteristic of mid century sociologists such as Talcott Parsons. In 1965 the two published <u>Awareness of Dying</u> in 1965, and followed up with <u>The Discovery of Grounded Theory</u> in 1967.

Core concepts
Strauss and Glaser describe the process of constructing grounded theory as occupying three steps--**data collection, coding and memoing**. The analyst **observes** a social world of interest. Then, he or she can start to identify distinctions that are important in this world. Looking at sick patients, an analyst could distinguish between machinery that enters the patients' bodies and machinery that does not. Then, these distinctions can be **dimensionalized**. In other words, sub distinctions that are important in the world under investigation can be identified. In addition to observations, analysts can also draw from the experiences we as social actors bring to the investigation (the fact that we can be said to know things that the people observed might also know).

Coding refers to how data is conceptualized and can refer to the work of coming up with categories in which to fit the data or the relationships between categories. Tentative conclusions and questions about the relations between categories or dimensions can be treated as hypotheses to be held up against further observation and experience. In the coding of data--the ways in which an observed phenomenon fits into a category--care must be taken to make sure the categories and the coding of observations and interviews is tightly linked with the observations and interviews in their context.

Theories emerge as memos based on the coding are examined in relation to each other and to the process of coding and observation. As they are being constructed, attention should be paid to what distinctions and relationships are more important than others or which ones will lie at the core of a theory. These core categories are ones that play a central role in integrating various facets of a theory. When the links and relationships are examined, held up against observations and experience, they can provide **conceptual density** to theories. Once theories emerge--or are constructed--they should be verified, held up once again to observations and experience. Once further observation or analysis won't add anything to the theory, it has reached a point of **saturation**.

It is perhaps important to note that--while Strauss and Glaser identify the stuff of research as three phases, observation, coding and memoing--these phases are very much intertwined in practice as a researcher is constantly holding emerging theories against observations.

Theoretical sampling is another core concept for grounded theory. It refers to the ways in which further observation or data collection can be guided by emerging theory and the insights that can be gained by comparing observations gained in different samples or among different populations. It seems as though theoretical sampling could provide an approach to the use of **comparison** (and the logic behind the selection for potential sites).

In relation to..
Grounded theory inherits emphases on action and the problematic situation from pragmatism and its emphasis on qualitative methods (and much else) from the 'Chicago School' of sociology.

Robert Park is seen as one of the founders of the 'Chicago School' of American sociology that prevailed at the University of Chicago roughly from 1920s through the 1950s. This tradition is often associated with the use of field observation and interviews to grasp the views of actors embedded in the social world under investigation.

Everett Hughes was a student of Park's. I know very little about Hughes other than that his emphasis on work came to be influential to Howard Becker.

A student of Hughes at the University of Chicago, **Howard Becker** is often viewed as the founder of labelling theory in his work Outsiders: Studies in the Sociology of Deviance published in 1963. Having worked as a jazz musician through graduate school, Becker researched the world of jazz musicians, investigating topics such as marijuana smoking among musicians by interviewing musicians. His later work, Art Worlds (1982), provides a compelling and accessible account of the worlds in which artists work. His attention to the material world which the artists operate and in which art is located and travels (and is constrained) is interesting when considered next to recent emphases in science studies on materiality and the environment. Becker provides insight into his methodology and emphasis on clear writing in Tricks of the Trade (1998) and Writing for the Social Scientists: How to Start and Finish Your Thesis, Book, or Article (1986).

The emphasis on close engagement with the social world being studied can also be seen in the work of scholars such as **Herbert Blumer**. Strauss was student of Blumer's at the University of Chicago in the 1940s. Himself a student of George Herbert Mead, Blumer is often associated with 'symbolic interactionism.' Here there is an emphasis on the individual in (a specific) context--in in his or her 'natural world'--and the importance of meaning. Meaning is considered to be a source of action and emerges out of interaction. This view problematizes the traditional notion that meaning operates as an attribute inscribed in objects, independent of any interaction with people (as in the Kantian noumenal realm). There is also an emphasis here on the importance of interpretation that emerges in something like an internal dialogue. While the meaning of objects comes from people, objects can resist our conceptions or the meanings we might assign to them.

Grounded theory seems to share interesting similarities to themes in **actor network theory**. Here an emphasis on following the actors resembles the emphasis, in grounded theory, on maintaining a close relationship with the data and the milieu out of which it can become 'data.' Here there is an emphasis on tracing the links by which a heterogeneous set of actors and objects can hold together as a network. The network is a kind of accomplishment here as the links must be continually enacted for the network to 'hold.' The approach of picking an object and 'following it' as different people touch it and as it becomes embedded in the practice of different social worlds describes one way of trying to trace the links in a milieu of interest.

It might be interesting to investigate the similarities and differences between grounded theory and approaches such as **ethnomethodology**. Often associated with the name of **Harold Garfinkle**, ethnomethodology could be considered to be a related approach. It is qualitative and emphasizes a close engagement with the social world under investigation. Here the emphasis on the embeddedness of the investigator in the world under investigation seems to resemble the rejection, in grounded theory, of speculative theorizing that presents itself as scientistic, removed from its object as something made of a different substance. Further, Latour seems to have been influenced by some of these kinds of qualitative approaches. Also, I would like to reread some of Leigh Star's work to see grounded theory in action.

Lineages:

josiah royce & william james
| |
george herbert mead (harvard ___, another founder of pragmatism ..w Dewey, James & Peirce)
|
herbert blumer
|
anselm strauss (trained at University of Chicago in 40s)
|
leigh star (UCSF 1983)

robert merton & paul lazarsfeld
|
barney glaser (columbia 1961, moved to UCSF & published Awareness of Dying with Strauss in 1965, and The Discovery of Grounded Theory in 1967)

john dewey **william james** **windelbrand**
| (university of michigan) | (harvard) | (__ germany)
robert park (1914-1936 at university of chicago)
|
everett hughes (trained at U Chicago in the 20s)
|
howard becker (University of Chicago 40s-50s ? => __)

6.5 Appendix: Steps of Grounded Theory Analysis

A table synthesizes the 6 steps of grounded theory analysis from coding to theorizing.

Steps of Grounded Theory Analysis
By Claude Arsenault
From: Paillé, P. (1994). L'analyse par théorisation ancrée. *Cahiers de recherche sociologique*, 23, 147-181.

In English

STEP	SUB-STEPS	DESCRIPTION	QUESTIONS	OBJECTIVE(S)	RESULT(S)
CODIFICATION		Identify, name, summarize, thematize each and every line	What is there here?	Identify what is being said in the interview	Codified corpus
		what is being said in the text on which the analysis	What is it?	without repeating the actual text	Codes
		is being done	What is it about?		
CATEGORIZATION	1. Creation of a list of already existing categories	Bring the analysis to a conceptual level by naming		Bring the analysis to a conceptual level	Categories
	2. Second reading (more conceptual)	the phenomena and events which come out of the data	What is happening here?	Put the phenomenon in perspective	Analytical memos
		in a richer and more encompassing way	What is it?		
			Which phenomenon am I facing?		
	3. Construction and consolidation of the categories				
	3.1. Definition	Specify what the category refers to	What do you mean by…?		
	3.2. Identification of the properties	Establish the category's attributes	What is the category composed by?		
			What are its attributes?		
	3.3. Specification of social conditions	Determine which elements are essential for the category			
		to be applied			
	3.4. Identification of their different forms	Follow the evolution of many dimensions of the phenomenon			
LINKAGE	1. Write a list of the categories	Compare the categories of the analysis		Find links between the categories	Graphic representation
	2. Examine the categories with the questions	3 possible approaches:	Is what I have here linked with what is there?	Improve the analysis	
	2.1. Graphic representation	- empirical approach	How and in what is it linked?	Evolve from description to explanation	
		- speculative approach			
		- theoretical approach			
INTEGRATION		Establish precisely the study's subject	What is the main problem?	Determine the precise objet of the analysis	Precise object
			In general, which phenomenon am I facing?		
			In definitive, what will my study be about?		
ESTABLISHMENT		Reproduce as reliably as possible the organization of the	What is the type of this phenomenon?	Identify the important attributes of the phenomenon,	Model
OF A PATTERN		structural and functional relations characterizing a	What are the attributes of this phenomenon?	its usual steps, its strong moments, its consequences	
		phenomenon, an event of a system	What precedes this phenomenon?	on different levels, etc.	
			What are the consequences of this phenomenon?		
			Which processes are involved in this phenomenon?		
THEORIZATION	3 strategies:	Reinforce the theory and weaken the diverging explanations		Consolidate the theory	
	- theoretical sampling	Sample the different manifestations of a phenomenon		Understand its variation	
	- verification of theoretical implications	Indicate the implications logically following from the theory	If… then?	Make sure the data supports the hypotheses	
		Confront the explanation of the			

In French

ÉTAPE	ÉTAPES	DESCRIPTION	QUESTIONS	OBJECTIF(S)	PRODUIT(
CODIFICATION		"Dégager, relever, nommer, résumer, thématiser,	Qu'est-ce qu'il y a ici?	"Dégager le témoignage livré lors de l'entrevue en évitant de répéter le verbatim"	verbatim codifié
		presque ligne par ligne, le propos développé à	Qu'est-ce que c'est?		codes
		l'intérieur du corps sur lequel porte l'analyse"	De quoi est-il question?		
CATÉGORISATION	1. Dresser la liste des catégories déjà formées	"Porter l'analyse à un niveau conceptuel en		Porter l'analyse à un niveau conceptuel	Catégories
	2. Nouvelle lecture plus conceptuelle	nommant de manière plus riche et englobante les	Qu'est-ce qui se passe ici?	Mettre le phénomène étudié en perspective	Mémos analytique:
		phénomènes et événements qui se dégagent des	De quoi s'agit-il?		
		données"	Je suis en face de quel phénomène?		
	3. Construction et consolidation des catégories				
	3.1. Définir	Spécifier ce à quoi la catégorie renvoie	Qu'entends-tu par…?		
	3.2. Dégager les propriétés	Déterminer les caractéristiques de la catégorie	De quoi la catégorie est-elle composée?		
			Quels sont ses attributs?		
	3.3. Spécifier les conditions sociales	Déterminer ce qui doit être présent pour que la			
		catégorie s'applique			
	3.4. Identifier leurs diverses formes	Suivre l'évolution de plusieurs dimensions du phénomène			
MISE EN RELATION	1. Dresser une liste des catégories	Comparer des catégories de l'analyse		Trouver les liens entre les catégories	Schématis n
	2. Examiner les catégories à l'aide des questions	3 approches possibles:	Ce que j'ai ici est-il lié avec ce que j'ai là?	Raffiner l'analyse	
	2.1. Schématisation	- approche empirique	En quoi et comment est-ce lié?	Passer de la description à l'explication	
		- approche spéculative			
		- approche théorique			
INTÉGRATION		Déterminer précisément l'objet d'étude	Quel est le problème principal?	Délimiter l'objet précis de l'analyse	Objet d'étu précis
			Je suis en face de quel phénomène en général?		
			Mon étude porte en définitive sur quoi?		
MODÉLISATION		"Reproduire le plus fidèlement l'organisation des relations	De quel type de phénomène s'agit-il?	"Dégager les caractéristiques importantes du phénomène, son déroulement	Modèle
		structurelles et fonctionnelles caractérisant un phénomène,	Quelles sont les propriétés du phénomène?	habituel, les moments forts de son existence, ses conséquences à divers	
		un événement ou un système"	Quels sont les antécédents du phénomène?	niveaux, etc. "	
			Quelles sont les conséquences du phénomène?		
			Quels sont les processus en jeu au niveau du phénomène?		
THÉORISATION	3 stratégies:	Renforcer la théorie et affaiblir les explications divergentes		Consolider la théorie	
	- échantillonnage théorique	Échantillonner les diverses manifestations d'un phénomène		Cerner la variation	
	- vérification des implications théoriques	Indiquer les implications découlant logiquement de la théorie	Si… alors?	Vérifier si les données soutiennent les hypothèses émises	
	- induction analytique	Confronter l'explication du phénomène aux "cas négatifs"			

6.6 Appendix: Response - Steps of Data Management

The memo 'Steps of Grounded Theory Analysis' inspired a memo on steps of Data Management.

Steps of Data Management and Steps of Grounded Theory
By Karen Baker
13 January 2008

The basis of grounded theory is well thought out. When summarized as steps, the steps appear pertinent to the fields of data and information management as well as to grounded theory. Because the steps have been developed at a meta or conceptual level, it may be possible to use them to generate awareness of the 'Steps of Data Management'.

1. issue framing
2. sampling design
3. data collection
4. codification
5. categorization
6. linkage
7. integration
8. establishment of a pattern
9. theorization

The first outcome of such an exercise is the realization that there are missing first steps. The new first step I have struggled to articulate over the years within the realm of information management: the framing or bounding of the issue at hand. I have identified this step as the point at which the context of subsequent work is constrained for a scientist. This early constraint creates barriers to comprehending subsequent data handling issues in the data workflow. In order to make this understanding visible, I have labeled this comprehension capacity as a 'readiness factor'. I wonder whether Grounded Theory would benefit from including an 'issue framing' step, and what would be the ramifications of this step-making process?

Steps 2 and 3 involve sampling design and data collection. These influence data description and analysis significantly. When listed, they become 'part of grounded theory'. A great deal of reparation work seems to result when the list is considered in a narrower, fragmented or atomized approach without steps1-3. Information Systems Journals encourage submissions today to include discussion of sampling and collection specifically. In data reuse, metadata requires gathering of information about these topics so that the data can stand independently outside the immediate location and collection activity.

A second outcome seems to be that steps 2 and 3 are frequently absent so unavailable to innovation in making or analyzing a collection. This absence, in turn, makes difficult, if not impossible to perform the later steps of linkage, integration and establishment of a pattern. One may hypothesize that Steps 1 throught 3 are missing because their focus is the scientific experiment/observation theory, logistics of sampling, sample collection and capturing of the data. This focus is one of data management rather than on the data record and its organization, that is, on information management.

*1 This memo draws on the steps of grounded theory table prepared by Claude Arsenault that summarizes an article by Pierre Paillé "la théorisation ancrée, résumant un peu les étapes".

6.7 Appendix: Memo on Conceptualizing Categories

Qualitative analysis by conceptualizing categories
By Claude Arsenault
From: Paillé, P., Mucchielli, A. (2003). L'analyse qualitative à l'aide des catégories conceptualisantes. In *L'analyse qualitative en sciences humaines et sociales.* Paris: Armand Colin, p.147-179.

What is the analysis by categories?

The analysis by categories is a qualitative analysis method. It permits the researcher to conceptualize and theorize while the analysis is going on, unlike any other method. This implies that during the annotation of the corpus, the researcher writes down category names in the margins. Throughout the process, those categories will be worked on, merged, divided or refined. They will be the core of the analysis and of the research report.

Paillé identifies three types of analytic work that are essential to the analysis by categories. First, a work of *analytical description*: the first categories to be created will simply name the phenomenon, making the immediate significations present in the corpus more obvious without adding an analytical dimension to them. When this step is completed and the corpus is well annotated, the researcher will continue with *interpretative deduction*. At this point, he will start to create significations, by either one of two methods. The first method is to use theoretical references, which help to situate the texts in a broader context. The second method implies using *theorizing induction*. This term refers to the construction by the researcher of his own categories and to their identification with precise terms and unique expressions. For example, Paillé mentions Auziol's "double communication".

The category is at the center of this type of analysis. It represents a set of condensed significations, meaning that its definition takes into account every aspect of the phenomenon it defines. It can be applied to every type of research material used for a certain project, no matter their nature or the nature of the phenomenon they describe. The elaboration of the category takes place in two fundamental steps, clarifying the category and validating it. To ensure that the category is clarified successfully, Paillé suggests to try and define the category, to specify its properties and to identify its existence conditions.

When talking about the internal and external validity of a research using analysis by categories, it is important to understand that the classic concept of external validity does not apply here, since what makes such a process so valuable is its unique character and its tight link with the theoretical background of the researcher.

What is the difference between analysis by themes and analysis by categories?

Contrary to a theme, a category designates directly a phenomenon. It goes beyond the descriptive nature of the theme by going over the simple content designation. It represents the creation of significations, and it is a fundamental constitutive element of the analysis and of the theorisation which will follow.

In the analysis by themes, the use of the category does not have the same level of importance. The concept of category itself is different. In theme analysis, the term category designs a rubric, whereas is category analysis, the category is directly involved in the analysis.

The gap which exists in theme analysis between the definition of the categories and their analysis is erased in category analysis by the role of the categories in the analysis.

What are the main strengths and weaknesses of the analysis by categories?

The analysis by categories is conceptually different from the other types of qualitative analysis. Before engaging in an analysis of this type, it is essential to understand what separates it from content analysis or theme analysis. The concept of category as seen in this type of analysis is not instinctive. It is important to grasp all its significations before proceeding to category analysis.

The categories can apply to any research material, but it is obvious that some categories will be at different levels, and that some will be more dense than others. We must see this variability as a strength of category analysis, because it permits the researcher to work with significations, slowly building the analysis. Each element thus has its place.

Two main difficulties might arise while using category analysis. First of all, the researcher has to be very careful not to paste in his analysis interpretations coming from anterior work or the literature. The interpretation must here rest on the construction of categories unique to the corpus. Similarly, in order for the categories to define entirely and perfectly the studied phenomenon, they must be unique to them, and not borrowed from other works.

Reference: Paillé, P., Mucchielli, A. (2003). L'analyse qualitative à l'aide des catégories conceptualisantes. In *L'analyse qualitative en sciences humaines et sociales.* Paris: Armand Colin, p.147-179.

6.8 Appendix: Memo on Ocean Informatics Definitions

A targeted analysis on ethnographic materials (interviews) prompted the writing of a memo on Ocean Informatics various definitions by particiapnts.

MEMO - O.I. DEFINITION - FROM TARGETED ANALYSIS
JANUARY 25, 2008
CLAUDE ARSENAULT

Through the analysis of four interviews held for the Ocean Informatics monograph project, different visions and definitions of Ocean Informatics emerged. The core notion at the heart of each of these definitions seems to be interoperability – whether from a technical standpoint or a social one. Every individual seems to have a unique perception and conception of Ocean Informatics's nature and of its role, centered on different dimensions of the project: communication, infrastructure, or data.

IM1[1], for instance, describes in her interview Ocean Informatics as being a **communication** mechanism between people. To her, OI is "the bubble which allows communication to happen". The physical infrastructure and data interoperability are means which help the participants attain communication. To describe this, the expression "social interoperability" seems the most relevant. This concept refers both to the human aspect of Lynn's definition and to interoperability, seen in a communicative perspective.

IM2 has a completely different approach. He defines OI as an "effort to bring together a lot of disparate areas of both data and expertise". His description focuses on the integration of the data from a **technical standpoint**. Contrary to IM1, he sees communication as a way to enable the technique. He agrees that channels of communication and a shared vocabulary must be created in order to achieve interoperability, but sees them as means rather than the goal to achieve. IM2 also mentions the iterative nature of OI's development and its particular culture of acute conceptualization and identification.

IM3 and IM4 both center their OI definition on **data**. To IM3, Ocean Informatics is the physical infrastructure which allows the scientists and the data managers to format and integrate the data. OI is a way to put data together and easily access it by achieving interoperability. What it provides ultimately is an easy access to information. To differentiate IM3 from IM4, we can say the former insists on **data use** whilst the latter concentrates on **data formatting** and the whole process behind obtaining integrated data. IM3 defines OI as a "common data management practice", and IM4 as data format rules.

[1] To ensure confidentiality, original names have been replaced by letters.

6.9 Appendix: Memo on Ocean Informatics as a 'community of practice' (CoP)

A discussion on a shared practice tying together members of the OI team prompted the writing of a memo on Ocean Informatics as a 'community of practice'.

MEMO: Is Ocean Informatics a community of practice? Notes from discussion on Wenger's text on CoP
By Florence Millerand
From: Wenger, Etienne. ONLINE. Communities of practice: a brief introduction. Web site: http://www.ewenger.com/theory/index.htm.

Could we define OI as a community of practice? Wenger provides 3 characteristics for a CoP: the domain, the community, and the practice. We apply these characteristics to Ocean informatics.

(a)The domain: What would be the shared domain of interest for OI members?

"The domain: A community of practice is not merely a club of friends or a network of connections between people. It has an identity defined by a shared domain of interest. Membership therefore implies a commitment to the domain, and therefore a shared competence that distinguishes members from other people. (You could belong to the same network as someone and never know it.) The domain is not necessarily something recognized as "expertise" outside the community. A youth gang may have developed all sorts of ways of dealing with their domain: surviving on the street and maintaining some kind of identity they can live with. They value their collective competence and learn from each other, even though few people outside the group may value or even recognize their expertise." (Wenger, online)

The shared domain of interest that grounds OI identity is *informatics* defined as the design and organization of data, systems and practices as applied to oceanography (OR: is *informatics* applied to oceanography i.e. system design for oceanographic data organization, use and preservation.

(b)The community: What makes OI a community and not merely a group of people? What ties together OI members?

"The community: In pursuing their interest in their domain, members engage in joint activities and discussions, help each other, and share information. They build relationships that enable them to learn from each other. A website in itself is not a community of practice. Having the same job or the same title does not make for a community of practice unless members interact and learn together. The claims processors in a large insurance company or students in American high schools may have much in common, yet unless they interact and learn together, they do not form a community of practice. But members of a community of practice do not necessarily work together on a daily basis. The Impressionists, for instance, used to meet in cafes and studios to discuss the style of painting they were inventing together. These interactions were essential to making them a community of practice even though they often painted alone." (Wenger, online)

Examples of OI activities, OI communication and collaboration mechanisms (*think of formal as well as informal interactions):
-activities: work at the design table; interactions with STS scholars and others scholars; OI reading groups; expectations that we take time to draw in theory (FM: not sure it fits here, maybe in domain?);
-events: OI luncheon
-tools: blog, web site, shared infrastructure e.g. datazoo
-?
(c)The practice: What do OI members share as a common practice? What defines them as practitioners?

“The practice: A community of practice is not merely a community of interest--people who like certain kinds of movies, for instance. Members of a community of practice are practitioners. They develop a shared repertoire of resources: experiences, stories, tools, ways of addressing recurring problems—in short a shared practice. This takes time and sustained interaction. A good conversation with a stranger on an airplane may give you all sorts of interesting insights, but it does not in itself make for a community of practice. The development of a shared practice may be more or less self-conscious. The "windshield wipers" engineers at an auto manufacturer make a concerted effort to collect and document the tricks and lessons they have learned into a knowledge base. By contrast, nurses who meet regularly for lunch in a hospital cafeteria may not realize that their lunch discussions are one of their main sources of knowledge about how to care for patients. Still, in the course of all these conversations, they have developed a set of stories and cases that have become a shared repertoire for their practice”. (Wenger, online)

As practitioners, OI members share a common practice comprised of:
-experiences: in data and system design, in application development for information systems;
-stories and cases: in interfacing (partnering) with oceanographers…
-ways of addressing recurring problems: through common design approaches, e.g. participatory design approaches…
-common knowledge: about ecological data, information system design…

7 Appendix: Qualitative Analysis Software

7.1 Appendix: References on the differences between various qualitative analysis software

References on the differences between various qualitative analysis software
By Claude Arsenault

Lejeune, C. (s.d.). Des outils libres, *Sociologie qualitative et analyse de contenu*. Consulté le 19 juillet 2007 au http://analyses.ishs.ulg.ac.be/logiciels/opencaqdas.html.

This website briefly describes and compares some free software which can be used in qualitative analysis. The author also states the main advantages of using free software in social sciences.

Brugidou, M., Escoffier, C., Folch, H., et al. (2000). Les facteurs de choix et d'utilisation de logiciels d'Analyse de Données Textuelles, *Lexicometrica*. Consulté le 19 juillet 2007 au http://www.cavi.univ-paris3.fr/lexicometrica/jadt/jadt2000/pdf/04/04.pdf.

This article describes a research which presents criteria on how to choose an appropriate software tool in qualitative research. It also has the particularity of presenting this from the point of view of the user.

Tesch, R. (1990). Qualitative Research, Analysis Types and Software Tools. New York : Falmer Press.

This book is a comparison of analysis types in qualitative research. It also reviews software tools, but since it was written over 15 years ago, that review is not completely accurate today.

Barry, C. (1998). Choosing Qualitative Data Analysis Software: Atlas/ti and Nudist Compared, *Sociological Research Online*, vol.3, no. 3. Consulté le 19 juillet 2007 au http://www.socresonline.org.uk/3/3/4.html.

This article compares two broadly used software tools in Qualitative Analysis, Atlas/ti and Nudist, by conceptualizing their differences concerning the structural design of the software and the complexity of the research project.

Kelle, U. (1997). Theory Building in Qualitative Research and Computer Programs for the Management of Textual Data, *Sociological Research Online*, vol. 2, no. 2. Consulté le 19 juillet 2007 au http://www.socresonline.org.uk/2/2/1.html.

This article weighs the pros and cons of using a computer-assisted method in qualitative research, and links this method to certain methodological approaches. It also issues warnings about possible methodological confusion due to increasingly powerful software tools.

7.2 Appendix: Semato in Review

7.2.1 Appendix: Memo on use of Semato for project

On Using Qualitative Analysis Software: The Case of *Sémato*
By Florence Millerand

Using software for doing qualitative analysis of ethnographic material is a common practice in social sciences. Many are available[2], yet choosing the right tool is not an easy task, and debates on the usefulness of software versus on doing the analysis manually are still relevant today (see: Wanlin, 2007). Having discovered a new tool developed at University of Québec in Montréal, called Sémato http://semato.uqam.ca/, we started to experiment with it. We trained a research assistant, Claude Arsenault in 2006, to use the software and carry on the analysis. Unfortunately, the software proved to be unsuitable for our research project given our heterogeneous ethnographic material and the openness of our research questioning. We detail our findings below.

A qualitative data analysis software based on semantic analysis

Sémato is a semantic analysis tool for text documents. As a qualitative data analysis software, it is different from most software such as AtlasTI or nVivo, because of its linguistic technology that provides a semantic assistance for categorization (coding) and for text mining on the corpus. It can create themes by linking words which belong together (as an example, the theme “live” would also include occurrences of the words “alive”, “inhabit”, “know”, “life” and “living”). Of course, there are semantic complications to take into account. For example, “live” may also mean “to demonstrate” or “demo real-time”. One of its features, the GTH (“génération de thèmes”, which literally stands for theme creation), automatically creates themes (or codes), making it easier to see quickly what a certain interview is about. The same feature can also be used on a whole corpus, giving a good idea of which themes are present in more than one interview. After those themes are suggested by the software, the researcher is free to merge them, divide them or refine them. Also, the software produces tables and graphs based on the themes.

It is important to remember that even though the software suggests themes, it does not understand the significations behind the words. For instance, when creating the theme “knowledge”, the software adds all the occurrences of “know”, “knowledge” and the other words in this lexical field. The software cannot see the difference between a sentence which is related to knowledge and a sentence which ends with “you know” (since the phrase may be very frequent in interviews, as a way to make sure your interlocutor is following, this may pose some difficulties). As a result, the “knowledge” theme will not be accurate, and would require sorting out relevant phrase and exclusion of non relevant ones.

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[2] The web site Content-Analysis.de presents a well-stocked and updated list of softwares for qualitative analysis : http://www.content-analysis.de/software/qualitative-analysis.

An online tool for all platforms suitable for cooperative work

Sémato is an online tool, which means it can be accessed using a web browser from any computer and any platforms, allowing cooperative work from diverse platforms. This software, although limited to an interface that is only in French, can analyze documents in English as well, since its lexical database includes both English and French. The vocabulary chosen by the creators is unique to the software (See: Semato Glossary), which can be unsettling at times.

The software requires the texts to be formatted in a certain way, which may require an extensive amount of work. For instance, questions and answers must be on separate lines and beginning of each question and answer must be identified by the same word or expression followed by a hyphen (" – "), after which the actual text can start (see: Memo on transcription format for Semato). When formatted, the text can be imported into the software, and then indexed. It is strongly recommended to avoid all spellings mistakes in the documents, since misspellings can alter the software's capacity to recognize the words and therefore cause problems with the automatic theme generation.

Once the themes are finalized, the software is able to produce interesting tables and graphs, showing similitude and dissimilarity between participant interviews for instance.

Sémato has all the features of traditional qualitative analysis software applications, including the option to attach analytical notes, to manually create themes and to link different documents. It is very user-friendly and can be mastered fairly quickly, using the online tutorial.

The wrong tool for our research project

The research project sought to build a monograph of the Ocean Informatics initiative, i.e. a detailed, descriptive, and exhaustive study (as possibly it can be) of the initiative. As a monographic research, it aims at highlighting general features of a phenomena, undertaking or entity (such an organization) from a case study – in this case involving the complexity of information infrastructure development for scientific communities from the Ocean Informatics initiative case.

We began the interview data analysis in an exploratory manner, having a set of loosely tied research questions rather that a well defined and circumscribed research problem. We first aimed at providing descriptive accounts on, for instance, what the participants think of the Initiative, how they define it, how they see their roles in it, with some more specific questions related to infrastructure or interoperability (what it meant to them), and to their jobs (their professional trajectory, their role with data, etc.). The semato software promised to be very useful, specifically with regard to automatic theme generation that would allow data exploration and thus potential theme discovery.

Unfortunately, the software proved to be unsuitable for our research project, mainly due to the high level of heterogeneity of our ethnographic material. The software is more suitable for homogeneous data such as data obtained with well structured interviews with identical questions and/or a well-defined set of themes where the problem is well formulated (as shown in the example used in the software tutorial). In contrast, our corpus contained a mix of semi-structured and open-ended interviews, and our research problem was far from being well circumscribed. Besides, interviews were conducted with different categories of actors, thus leading to a vast array of themes and different questions order.

Why the Semato tool didn't work well for us can be summarized by the following points:

- Text formatting was time consuming: an extensive amount of work (approximately three hours per interview) was required to format and correct each of the 17 interviews which were to be analyzed.

- Vocabulary specifics was a barrier: Even if the software is user-friendly and the online tutorial easier and useful to learn, appropriating Semato specific vocabulary took some time, and continued to be a barrier between team members who have learned the software and those who have not.

- Application was unsuitable for heterogeneous data: Depending on the corpus analyzed, automated theme creation could result in a list of a few themes (in projects where interviews content is homogeneous and addresses a limited number of topics) to hundreds of themes (in projects where themes are heterogeneous and disparate), thus limiting strongly the relevance of this feature in the latter case. Yet, the software provides a "best themes" option that selects the 25 themes which are the most precise semantically and the most significant considering the corpus. When we ran the automatic theme creation feature using this option, 21 themes out of 25 included the word "data" – as we could have expected, and providing no new or unexpected theme. In other words, the automatic theme generation didn't provide any new theme that we haven't anticipated. This could be interpreted as a good match between our research intuitions pre-analysis and the analysis results, or as a limit of the tool in terms of theme generation.

Important, additional factors other than those related to the software need to be stressed. These factors relate to the research project management more generally:

- Lack of resources (time and expertise): with our list of automatic created themes, some more work was required to refine them until they would represent semantic units, and thus potential new categories. This kind of work cannot be automated, e.g. carried out by the software, but has to be done by the research team with the research questioning and conceptual framework in mind. Our research assistant, who was the person trained on the software, left the team just before this phase had started, leaving the task unfinished. The supervisors had delegated the task of working with Semato and neither was in a position to make the investment required to appropriate the software. It represented too much of a burden for the other team members, and the interface in French only limited communication about the analysis. We decided to pursue the analysis manually, using a compiled file with all interviews (allowing for text search).

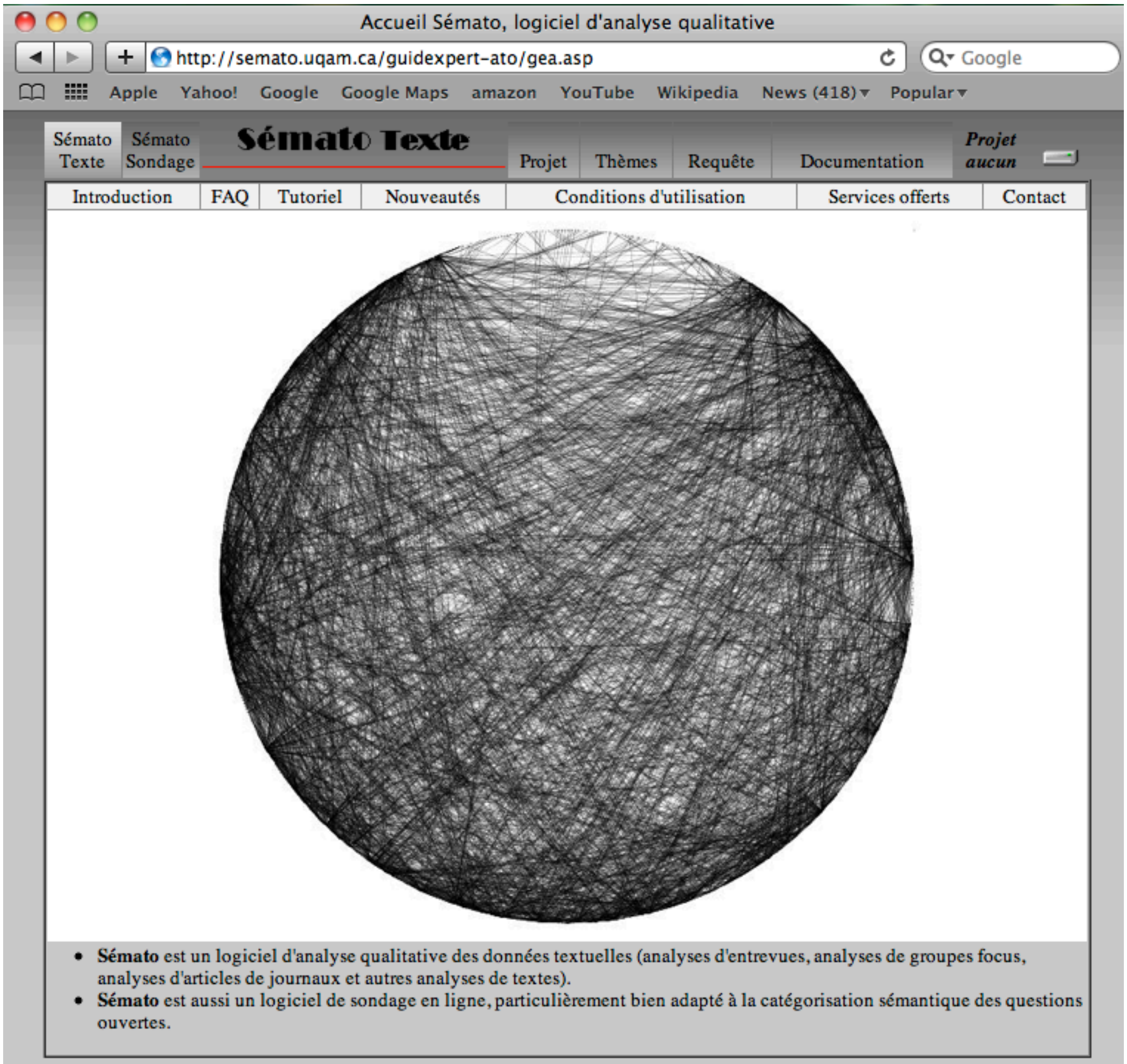
- Lack of success may be attributed to naivete in terms of time and planning in addition to the typical enthusiasm for use of available local tools that seem to hold many possibilities. There was an overestimation of student capacity to use the tool. From a management perspective, we made the mistake of lumping together skill acquisition with technology (ability to investigate and lay out options) with the capacity for synthesis and decision-making.

Conclusion:

As happens often with qualitative data analysis software, our Sémato experiment revealed an unacceptable balance with a disproportionate effort between investments made (in terms of resources) and gains obtained. The more tangible benefits of this experiment are the many texts that have been produced in the course of the project that improved our understanding of both the software and its limitations, of our methods, and of our research analysis. We wrote a series of memos on the software itself (the main features of Semato (Appendix 8.8.3), Semato glossary (Appendix 8.8.4), Semato transcription format (Appendix 8.8.5), References on the differences between various qualitative analysis software (Appendix 8.7.1)), on our methods (Grounded theory (Appendix 8.6.4), Steps of Grounded Theory Analysis (Appendix 8.6.5), a Response to Conceptualizing Categories for Information Management (Appendix 8.6.6)), and on various analysis elements (memo on Ocean Informatics as a community of practice (Appendix 8.6.9), memo on Ocean Informatics Definitions (Appendix 8.6.8)). The writing of these memos was prompted by our analysis strategy based on grounded theory – where memo writing is a key process in analysis (see: Strauss and Corbin, 1998) – and also because of our need to formalize and circulate texts to improve learning and mutual understanding between us. The memos helped a lot in circulating and sharing understanding about the analysis process while carried on with the software, and continued to be useful afterwards while pursuing the analysis manually.

Though somewhat familiar with the claims and realities of using the qualitative analysis software packages NVivo and Atlas TI, we began work with Semato with a great deal of enthusiasm. Not only was it a locally developed application that worked on diverse platforms, those supporting it were responsive to our inquiries. In retrospect, a lesson learned is the value of identifying a few representative interviews to serve as a limited set of materials to be prepared for use as a test case. Developing materials and queries to be run as a pilot study would allow investigation of both expected basic functionality as well as new, advanced features.

7.2.2 Appendix: Semato – A software for quantitative and qualitative analyses (home page)



7.2.3 Appendix: Description of Semato main features and their use in qualitative data analysis

Memo: Sémato : Description of the main features and their use in qualitative data analysis
By Claude Arsenault, October 2007

"Analyse Express" (Express Analysis):
- provides descriptive statistics for the whole corpus or a selected section
- the statistics are mainly about the project categories (as defined by the researcher) and the main themes (found by the software)
- should be used after the transfer of documents into Sémato
- the command produces 4 tables:
    - the first table shows the occurrence of the project categories and the 100 best GTH generated themes, per document
    - the second table shows the occurrence of the project categories and the 100 best GTH generated themes, per text
    - the third table presents descriptive statistics concerning the project categories, per document
    - the fourth table presents the frequency of the themes in each document, calculated in percentages and with the chi-square
        - the results can be sorted according to the %em column (it evaluates the variation between a result and the average) in order to see which theme is associated more closely with a certain document, as monitored by the chi-square
- at the end of the results page, there is a chi-square independence test, evaluating the resemblances or differences between the documents in regard to the GTH generated themes.
- using the results of this command, the GTH generated themes can be modified, merged or deleted
- if themes have already been created before the Express Analysis, the command will use those rather than to generate new ones using the GTH.

"Lexique Express" (Express Glossary)
- builds conceptual alphabetical and frequencial indexes
- helps to go through the data easily and fast by organizing it
- can be built for the whole corpus, a single document or a project category. Using the "mode ET", some of those options can be combined (very useful to analyze only the texts corresponding to the answers and not the questions, for instance).
- creates two files: an alphabetical glossary and one classified by frequency
- the particularity of this glossary is that it not only includes words, but also expressions (eg: *database analysis* or *ocean informatics*)
- by clicking on a word or expression, the according binding page opens

GTH
- automated generation of themes by the software
- separates the themes it creates in three files, depending on whether they represent objects (what is talked about), actions (what is done), or qualities (qualifications)

- the generated themes should be considered as semantic gathering propositions, which can be modified or refined manually afterwards
- clicking on a theme will accept it and include it in the project's theme list
- automatically produced after the indexation of the texts
- can also be commanded manually to use its more advanced functions: custom GTH

<u>"GTH sur mesure" (Custom GTH)</u>
- GTH can be customized in three ways

1. **Definition of the domain**
- selects only a section of the corpus, either according to:
- a project category
- a document

2. **Definition of the number of themes**
- the software will select the best themes (25, 50, 75 or 100)
- those themes will automatically be added to the theme list and not to the GTH list
- this option favors themes with multiple "synapsies" and are thus more precise semantically
- interesting to use when beginning a project before building themes manually

3. **"GTH orientée": oriented GTH**.
- allows the researcher to know whether a certain theme differentiates a document with regards to a project category using the chi-square
- can also identify themes which do not differentiate a document, but are generalized to the whole corpus
- must be used with the selection of the best themes.

- the themes provided by the custom GTH will be identified as such by the presence of two letters in their name
- can be useful when combined with "introjection", which helps to refine a theme by using a custom GTH for a section of the corpus delimited by a manual theme. The results of the custom GTH can be used to enrich the manual theme.

Manual theme > Custom GTH > Ingredients for the theme > AST

<u>"Assistant Scripteur de themes (AST)" (Assistant Theme Writer)</u>
- helps to define automatically generated themes by analyzing their ingredients and suggesting new ingredients semantically associated
- can also be used to create a theme if the researcher indicates ingredients to start with
- on the results page, the name of all the ingredients are links which lead to a new page where the ingredients' context is shown
- there are two types of ingredients:
  - **Ingredients A**: general ingredients which were used to start with and the elements of their semantic field
  - **Ingredients B**: expressions which contain a certain ingredient A
- selecting the ingredients will include them in the theme
- a group of words can be used as an ingredient

- The AST should be used a few times in a row. Each time, the ingredients which were selected the time before become basic ingredients

“Page d’arrimage thématique” & “mémos analytiques” (Thematical Binding Page & Analytical Memos)
- a thematical binding page will be opened whenever there is an interlink on a text or a word (for instance in the AST)
- a number is assigned to every text of the corpus and another one to every sentence of each text when the document is indexed, those numbers will be used for the thematical binding
- the thematical binding page presents the texts, the sentences which compose them and the themes or memos linked to each sentence or text.
- themes and memos can be added or deleted from a text or sentence using this feature
“Requêtes” (Requests)
- 2 types: tracking and analysis
    - **Tracking**: allows searching the corpus to find texts with specific characteristics
    - **Analysis**: presents a few options for preliminary analysis on the corpus

“Réseaux de similitude” (Similitude Networks)
- type of analysis request
- analyzes the distance between the textual gathering units (created by the project categories) in the corpus
- looks for the resemblance between each textual unit pair, the pairs being set by the researcher when he selects the project category he wants the analysis to be based on
- can be built for different linguistic levels (depending on the use of “synapsies”, lemmas, semantical fields or selected themes)
- it is recommended to try using different levels in order to discover different types of similitudes
- the researcher must decide whether he wants to use the frequencies in the sentences or in the texts

“Requêtes de repérage” (Tracking requests)
- 3 types:
    - **Project categories**: searches the corpus to find texts according to a parameter defined by the researcher
    - **Themes**: searches the corpus for texts related to a certain theme
    - **Text search**: by typing in an expression or a sentence (in French), the researcher will obtain the most similar occurrences in the corpus
        - to get more significant results, the function “with semantical field” can be used

7.2.4 Appendix: Semato Glossary

Sémato: Glossary of the main terms used by the software			
October 2007			
French Word or Expression	**English Equivalent**	**Definition**	**Semato Feature**
Arrimage	Binding	To create a link between a sentence or a text and an analytical element	Analysis features
Arrimage thématique	Thematical binding	To apply a theme to a sentence or a text	Thematical Binding Pages
AST (Assistant-scripteur de thème)	Assistant Theme Writer	Analyzes the ingredients of themes created by the GTH and suggests new semantically associated ingredients	AST
Bouton cible	Target link	Link which, when next to a text, leads to the texts that are most similar to it.	Analysis features
		when next to a group of themes, it commands a tracking request for those themes.	
Catégorie de projet	Project category	Categories determined by the researcher, which define each document	Analysis and Requests features
Configuration focus	Key configuration	Configuration of a similitude networks which presents the most sub-networks	Similitude Networks
Contexte d'un ingrédient	Context of an ingredient	Broader expression which includes a certain ingredient	Themes
Document	Document	A text file (an interview)	All
GTH (Génération de thèmes)	Automated Theme Generation	Automated generation of themes by the software	AST
Indexation	Indexation	Broad analysis of the corpus by the software, required to be able to use the documents with the software.	Indexation
		also produces the automatic GTH.	
Ingrédient	Ingredient	Word, expression or theme which composes a theme	Themes
Introjection	"Introjection"	To find elements for a theme using custom GTH	Custom GTH
Lemme	Lemma	General form of a word (for instance, the infinitive for a verb)	
Mode ET	AND mode	Allows the researcher to selects more than one option when defining a command	Most commands
Phrase	Sentence	Section of a text	All
Poids d'un réseau	Weight of a network	Formula used to find the key configuration of a network. It uses the level of resemblance between the elements	Similitude Networks
		of a network and the number of elements in the said network.	
Poids d'une configuration	Weight of a configuration	Formula using the weights of the networks and the number of networks to establish the key configuration	Similitude Networks
Portrait catégoriel	Categorial description	Gives the composition of a certain network in regard with the selected project categories	Similitude Networks
Synapsie	"Synapsie"	Recurrent expression which has a unique meaning	
Synapsies multiples	Multiple "synapsies"	Recurrent expressions composed of more than one word and are more precise semantically	
Texte	Texte	A section of a document (in the case of an interview, each question and each answer would be a distinct text)	All

7.2.5 Appendix: Transcription format for Semato

Memo: Transcription format for SEMATO
By Claude Arsenault
August 8, 2007

- Questions and answers must be on separate lines
- The beginning of each question and answer must be identified by the same word or expression (it can either be the name of the person speaking if there is only one interviewer and one interviewee, or any expression, as long as it is constant all through the interview).
- If there is more than one interviewer or interviewee, a distinction between both can be made by adding a second identification before the text, as long as it is after the original "-"
- The identification must be followed by a " – ", after which the actual text can start.
- It is also important to try and avoid all spelling mistakes, since they can alter the software's capacity to recognize the words.
- Avoid mentions of the time in the first part of the text (the identification of the speaker)

Example with only one interviewer and one interviewee:

Florence - What did you say, the person that .... who gets.
Lynn - Yea, gets or who gives them what they want.
Florence - OK. But you say get or give. Sorry ....
Lynn - I said get. Who gets them what they want.
Florence - OK. OK. Sorry. OK. And how do you think they see your role with the data.

Example with two interviewers:

Question - K - Hmm
Elizabeth - Ahh. I got into the field because I wanted to go to sea and there was a slot.
Question - S - Oh.
Elizabeth - But that's not what you wanted to know.
Question - S - Well that's a good reason. I mean I'd, every time I come down here I want to become an oceanographer.

8 Appendix: Paper on Role of Information Management

Paper submitted, reviewed, revised but not accepted in 2008 for Environmental Information Management (EIM) Conference.

Thoughts on the Role of Information Management: A Local Example

Karen Baker*

* Scripps Institution of Oceanography, University of California, San Diego, 92093-0218, USA, email: kbaker@ucsd.edu

Keywords: informatics, information management, information mediation, information systems design, infrastructure, sociotechnical

Abstract

Information management faces many challenges in an era of ever expanding digital recordkeeping. In this paper a key information management challenge is considered: scaling of local site capacities in order to address calls for public data reuse but also to support new local data uses and reuses as well as new concerns with respect to sustainability. Information management arrangements at two LTER sites illustrate a changing role described by an information management strategy that augments previous efforts. Development of a strategy and accompanying goals contribute to design of a local information infrastructure.

Introduction

The term information management is in common use yet its definition and relationship to digital records are understudied. With scientific support over the last decade focusing on changes in technology use, data sharing, and cyberinfrastructure building, issues relating to local information mediation and management arise. The LTER research community shares an overarching community goal of long-term ecology that is grounded by local biome field studies and long-term datasets. This community is organized as a multi-level configuration of sites and network with an information manager at each site working in conjunction with an information technology team at the network office. In considering how information management conducted at sites changes over time, elements relevant to the vitality of local information management and to community networking may be identified.

Background and Setting

The LTER network makes visible aspects of information management and networking that are related to data curation and to interdisciplinary, collaborative work. The synergistic arrangement of site-based scientists and information managers charged with a) studying a local biome and 2) leading participation in network-based synthesis creates an organizational structure for negotiating a well-recognized tension in priorities between local study and global synthesis. This may be viewed as a set of problems to resolve, balances to arrange, and/or dichotomies from which to learn.

The development of an updated site information management strategy was triggered for two LTER marine sites by a series of events – site-based and network-based. Palmer Station (PAL) became part of the LTER network in 1991 with a field study area off the Western Antarctic Peninsula; California Current Ecosystem (CCE) LTER joined LTER in 2005 with a field site offshore of Southern California. Information management for the two sites is collocated in the Integrative Oceanography Division at Scripps Institution of Oceanography, University of California San Diego where the majority of CCE research participants reside. PAL investigators are geographically distributed with the lead institution originally located at UCSB and moving to Marine Biological Laboratory in Woods Hole in 2008. The information system of PAL and CCE developed in response to a noticeable absence of support for first access and then query or improved access to (small) but complex datasets that are key to local studies of the biome. In this case, local is defined as close to the source of data collection.

Discussion

Strauss (1988) juxtaposed the notion of short-term care with that of long-term care. Both are needed – immediate and extended-horizon responses – and are intertwined in a complex site information management development trajectory. Once out of a setting that is logistically well-organized, highly-instrumented technically, and placed organizationally (i.e. that of a lab with lab-based data collections), data move to an open system influenced by local circumstances, human factors, and cultural forces. New types of infrastructure are required to continue the blend of existing and new needs into the longer-term trajectory of information management. This involves a scaling of individual efforts through development of a local information infrastructure that enables sites to be active nodes - reactive in terms of data collection priorities and proactive in terms of data description and exchange. For the two sites, this has involved developing a local environment that recognizes and supportes 1) interdisciplinary partnering, 2) new types of roles for information mediation; and 3) growth of sociotechnical infrastructure.

Partnering with social scientists has provided PAL and CCE the opportunity to reflect on data and information management practices. This generated awareness and a deeper understanding of concepts such as information management, community, data practices, classification systems, informatics, and information infrastructure. We have researched communication through storytelling as a form of narrative where the story may be seen as a case of extreme metadata (Karasti et al, 2002). Ethnography is being used to capture the experience of information managers speaking about the role of information management as having multiple dimensions involving scientific services, data services, and technology work (Karasti and Baker, 2004). An understanding of all roles including those of interdisciplinary partners is being explored (Ribes and Baker, 2007; Karasti and Baker, 2004; Millerand and Baker, submitted). More recently, we have explored the ties of information management with data practices in terms of data stewardship (Karasti et al, 2006) and data curation (Karasti et al, 2007)

The LTER multilevel arrangement of sites and a network of sites has wide spread ramifications in terms of our conceptual model as well as our strategies. It represents a setting that on a continuing basis makes explicit the inherent dichotomies and enhances comparative study as well as creates an interesting environment that can attract and retain the expertise needed for contemporary informatics initiatives. For example, in order to comprehend the full trajectory of site developments in the LTER Decade of Regionalization from 1990-2000, a period when the Internet became a factor in how information management played out, it is important to recall that site information managers worked on independent Network Information System (NIS) modules – site description, bibliography, and climate – as well as a framework for assembling them (Brunt, 1998; Baker et al, 2000). In practice, the LTER sites themselves are both training grounds – places that are teaching about informatics while doing local information management – and learning environments – places where experiences meld with theory to create a foundation for the applied work of informatics. A network with the role of information manager organizationally prescribed for each site presents a unique configuration that can highlight particular types of information mediation. The configuration also has implications for information system development as well as local adoption of community standards. Delays in the deployment of standards within the LTER have been interpreted as "revealing neither the capacity of resistance of the users (information managers plus scientists) facing enactment of a community standard nor the limits of the EML standard itself as a shared standard." (Millerand and Bowker, in press). In practice, when information managers make visible and explicit the difficulties of enacting a standard, they accomplish a number of things critical to infrastructure design and community coordination by contributing to the elaboration of data processes.

Growth of local information management represents a contemporary strategy for designing information infrastructure that is integrative. Technical scaling frequently appears deceptively straight-forward but experience reveals a myriad of related sociotechnical factors addressed by design initiatives drawing on studies of language and categories, the theory of social sciences and informatics, and integrative activities with partners across multiple studies (e.g. Cherns, 1976; Bijken and Law, 1992; Fischer, 2002; Kling and Lamb, 1999; Mumford, 2003). The LTER is rich in experience with diverse scientific practices, data practices and collaborative practices. Folk definitions of experience state: "Experience is what you get when you don't get what you were expecting" or "Experience is what you get when you don't get what you want". Our interdisciplinary team has considered the concepts of building/growing infrastructure (Bowker et al, in press), articulation work (Baker and Millerand, 2007a), standards-making (Millerand and Bowker, in press), knowledge-making in differing knowledge provinces (Baker and Millerand, 2007b), local information environments (Baker and Chandler, in press). In order to meet the need for data query and integration at the site, a technical choice was identified that involved moving from text data files to a relational database on the backend while sociotechnical concepts informed the information system design effort as part of a larger information infrastructure initiative.

Case Example

The development of information management at PAL & CCE provides an example of changes in information management that have occurred over time. An understanding of technical data management has broadened to information management with explicit sociotechnical dimensions. Ocean Informatics represents a conceptual framework for a team of information specialists from multiple projects. Drawing upon interdisciplinary partnerships, the role of information management expands, bringing together conceptual, organizational, and social elements along with the technical.

Informatics is an applied field that works at the intersection of a domain science, information sciences, and social sciences, that mediates interactions, interfaces, and interdependencies of information while facilitating informatics research. In the case example, the domain is marine science. Ocean Informatics (Baker, Jackson, and Wanetick, 2006) provides a local information management identity separate from any one project, a forum for cross-project discussions and emphasizes the applied nature of our work while drawing in information and design theory. Working with multiple projects provides a larger context for each project – offering up a window onto a larger set of circumstances that frequently foreshadows a future context or provides a reminder of past issues.

The fieldwork of PAL and CCE is organized around cruises and seasons. Each is considered a study, i.e. the January 2007 cruise or the 2007-2008 season with Spring-Summer Antarctic sampling from October to March. The original data system was designed with twin aims: access and simplicity. It used a hierarchical file structure that reflected the organization typically used in participant labs. The system architecture mimicked that of the NIS schema; it focused on individual support modules–personnel, bibliography, and dictionaries and research modules of data and metadata. The similarity of site and network models was not surprising at a time when sites and network office were gaining experience jointly with data practices, design, and networking. After a number of years of making individual data files available on a study-by-study basis, the Palmer investigators requested an information system redesign that would provide both data query and data integration.

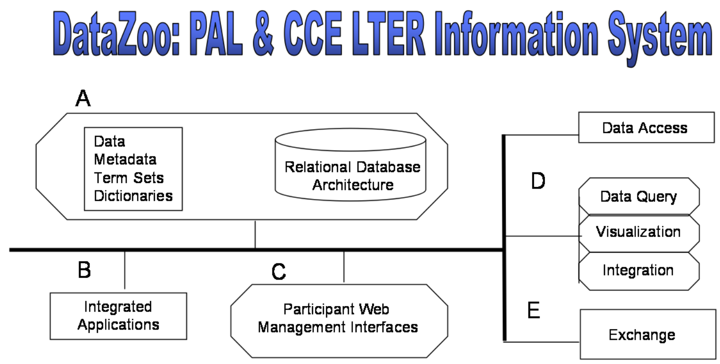


Figure 1: DataZoo information system schematic showing a service bus (thick lines) connecting multiple system elements: a) databases, b) independent applications, c) web enabled participant management interfaces, d) 'data use' functionality and e) data exchange.

The design of an updated information system was initiated in 2002 with a design approach growing over time to address new system architecture requirements: the ability to handle multiple projects, to facilitate data exchange, and to engage participants in new ways. The concurrence of events including development of social science partnerships, of an Ocean Informatics framework and of joint efforts with the CCE project spurred assembly of resources and an informatics team interested in the challenge of designing information systems and an information infrastructure to support scientific research as part of an enriched information management trajectory. **Figure 1** shows a schematic of the Ocean Informatics information system, DataZoo (http://oceaninformatics.ucsd.edu/datazoo). Planned and recognized as being in a permanent state of redesign, DataZoo is a data and metadata repository system and publishing forum that includes a dataset catalog, personnel directory, and help system. Dictionaries and term sets play a key role in the architecture and use of the system. Site metadata takes into account local and community standards building upon the Ecological Metadata Language to include unit, attribute and column qualifier details. DataZoo is recently organized into three web-based functional units – data, resources, and management, the latter two designed specifically to engage the learner and the data contributor stretching the system reach to the lab or desktop so contributors are able to upload their own data - and reciprocally to update their data practices. This approach contributes to the transformation of the role of information management from one largely of locating, proofing, and ingesting data to one of mediating and collaborating, designing and analyzing.

Carrying out design in the midst of developing concepts, frameworks, and initiatives, the Ocean Informatics team found it valuable to revisit information management development using two coordination mechanisms. First, there is an effort to identify and articulate an information management strategy. Second, following the example of scientific research components that state their objectives succinctly, the process of capturing specific information management aims in a set of objectives was initiated.

Concluding Remarks

In conclusion three aspects of an information management trajectory have been highlighted: a) partnering that draws in additional expertise in social and information sciences as well as across related projects in order to better understand the tasks of information management, b) roles of information mediation that bridge data practices and theories, and c) the growth of integrative infrastructure that supports information systems. This work contributes to the conceptual development of local information management using a case example to illustrate interdisciplinary partnering, information mediation, and the growth of local infrastructure. The trajectory concept provides a framework within which multiple factors are brought together. The distinction between technical and sociotechnical growth is illustrated, including the social and organizational along with the technical. The case example suggests two mechanisms for augmenting local information management: the development of an information management strategy and statement of local information management objectives.

Starting with the LTER ISSE figure that provides a community context for cyberinfrastructure, local information management for the case study may be represented by a modified model (Figure 2). Informatics is added as a research element in its own right and information infrastructure is added as an integrative substrate across all research activities. Six facets of information management are portrayed as supporting environmental & information action and awareness.

Implications of this work relate to the value of conceptualizing the role of local information management. The local information management perspective provides field experience that shapes and informs infrastructure building within a local scientific research team close to the data source but also within networks of partners. Perhaps the best way to end is to restate the question that represents a starting point for

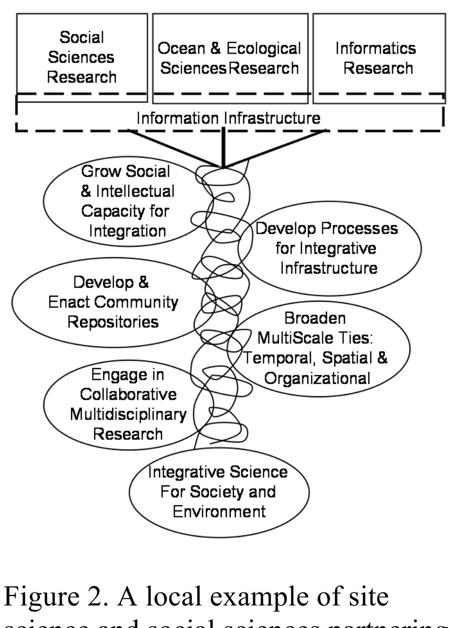


Figure 2. A local example of site science and social sciences partnering with informatics (inspired by LTER ISSE initiative brochure figure).

data stewardship and data curation research: What is the vision for local in information management?

Acknowledgements

Acknowledgement is given to the Ocean Informatics team – researchers, technicians, programmer/analysts, system administrators – contributors, designers, and users all. In particular, recognition is given to the information design work of Mason Kortz and James Conners; the analysis work of Lynn Yarmey; the systems administration of Jerry Wanetick and Nate Huffnagle; and the community support of PAL and CCE participants.

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9 Appendix: Event Logger: Summer Project Proposed Paper/Poster

The event logger was the focus of a summer project of Brian Lindseth in 2006. The account of the logger was prepared in a format for CHI (Computer Human Interfaces) but was not accepted for presentation.

Collaborative Design of an Oceanographic Event Logger

Brian Lindseth
Department of Sociology
University of California, San Diego
La Jolla, CA 92093
brianlindseth@gmail.com

Karen S. Baker
Scripps Institution of Oceanography
University of California, San Diego
La Jolla, CA 92093-0218
kbaker@ucsd.edu

CHI 2007, April 28 – May 3, 2007, San Jose, USA
ACM 1-xxxxxxxxxxxxxxxxxx.

Abstract
We report on a design project that is in-progress. Iterative prototyping of a new field instrument, used to link data collecting practices and data collection preservation, also addresses issues of time, space and categorization that influence subsequent data integration. The development of an event logger system is unfolding as an oceanographic field research case study and provides an opportunity to consider collaborative design as one aspect of local information infrastructure building.

Keywords
Infrastructure, iterative design, invisible work, oceanographic research

ACM Classification Keywords
H.5.2 User Interfaces: User-Centered Design, Prototyping; H.5.3 Group and Organization Interfaces: Computer-supported Cooperative work; E.2 Data Storage Representation: Object Representation, Design

Introduction
We provide an account of an event logger system deployed recently on a series of oceanographic research cruises. Shipboard activities are carried out by investigators with different disciplinary and institutional

Quote #1. *A CalCOFI participant discusses the dilemna of data that does not fit into existing categories:* "*CalCOFI's always been focused on stations, so anything between the stations has been ancillary or extra. And it's not—it's not reported by CalCOFI or stored in their databases for public consumption. You know, it's all on a DVD somewhere or a CD somewhere, but it's not* easy to get at".

Another goal of the project has been to implement a reflexive design process—one open to incorporating insights from the design literature--broadly conceived--as well as from the successes and failures encountered in the field.

Design: Setting, System, and Process

Our object of study is an event logger system designed to provide for the possibility of both participant dialogue and interoperable data across organizations. Therefore, while much attention will be paid to the event logger system itself, the evolution of the design process is also an object of analysis. Some assumptions underlie our study: the recognition of the importance of existing practices, the value of a design approach that is both iterative and collaborative, and recognition of the long term implications of infrastructure building processes (Bowker and Star, 2002; Baker et al, 2005). Methods for our work include use of design, participatory action research, ethnographic methods, and an interdisciplinary research team as collaborative mechanisms supporting data integration.

Webs of practices and technologies of each organization—the data management conventions, the actors, skills and routines linking measurement strategies and on board data collection together with database and reporting technologies into a functioning process—could be considered as local infrastructures. They provide a relatively invisible, relational framework along which the measurements from a cruise travel as data into a database to be delivered on a website. Such frameworks embed classification systems that both include and exclude data (Bowker and Star, 1999).

One way we can see classifications in play is in the ways in which space is measured. For both sets of researchers, the categories are stations in contrast to the more granular geolocation elements of latitude and longitude. And, as a CalCOFI participant noted (see Quote #1), if a measurement does not find an easy home in the categories of a given infrastructure, it can fall between the cracks. *Extra work is needed to find the data that do not fit easily into existing categories of the local infrastructure (Walsh and Ungson 1991; Bowker 2006).*

The event logger system provides a unique identifier in the form of an event number for each measurement as well as a common measure of space and time. It creates a bridge along which oceanographic data and data collections can travel between organizational infrastructures. Designed as a local, 'ground up' solution (and not an overarching or generalized solution), the event logger could be described as a dedicated gateway (David and Bunn, 1988; Egyedi, 2001; Edwards, forthcoming), linking infrastructures that are, themselves more stabilized and resistant to change (Hanseth et al, 1996).

In emphasizing a design approach that is both iterative and collaborative, we are building on previous work that focuses on the distinction between designers, users, and support personnel (Clement 1993; Bratteteig 2003; Grudin 1993; Kanstrup 2005). Here, the openness towards collaboration finds theoretical resonance in efforts to broaden the role of designers.

Kanstrup and Bertelson (2006), for example, examines the role that IT support workers play in designing the systems they support. Suchman highlights the 'artful integration' work that goes on in everyday practice (2002, 1994). This literature seeks to extend our notions of who can count as a designer. This move brings visibility to the work traditionally seen as being less significant – or not seen because it is perceived as less significant (Star and Strauss, 1999; Suchman 1995, 2000). In addition, work on the distributed

Quote #2. Incorporating diverse voices over time, a lead designer retrospectively observed: "the development's been incremental, doing robustness checks along the way."

Figure 3. Working to install the event logger on the ship.

nature of cognition brings visibility to processes, tools, and features of the environment in which cognition, more narrowly conceived, takes place (Hutchins 1995; Hollan et al 2000).

The event logger describes an on board computer technology and related processes. An event log is produced as an output, a list of each measurement that has taken place on board the cruise. It is a sequential, digital record in a standard format that can be accessed by all cruise participants. Together, the event logger and the event log were designed to span the flow of data - from measurements in the field to a shared data repository. The standard time and location allows for translation of measurements across organizational boundaries and a unique identifier (the event number) allow commensurability to be enacted at the level of the database, establishing relations across research organizations and ultimately enabling queriability In this context, the event logger was designed as a way of distributing data management work (Hollan et al, 2000; Turner et al, 2006). Instead of relegating the work of cleaning up the data to post cruise data users, the work of "keeping the data clean" – organizing and relating the data - begins at the source of the data itself in measurements on board cruises. In extending post-cruise reconciliation efforts into the cruise, the event logger functions to distribute this work over time and a wider set of actors (Hutchins 1995, Hollan et al, 2000, Halverson & Ackerman, 2002).

From their beginnings, the event logger and the event log can be construed as boundary objects that span organizations collecting the data (Star and Ruhleder, 1994; Halverson and Ackermen, 2002). As the system has evolved, it has gained momentum (Hughes 1987) and become more embedded (Egyedi, 2001) or stabilized (Latour 1987) in the infrastructures of each organization. The event logger is in the process of becoming by being a tool in use (Norman, 1988; Suchman, 1987). It has become part of the environment in which measurements start to become data; it serves as a prompt for communication and an architecture component linking the organizations' infrastructures. This shift has not proceeded without incident.

With early iterations uncertainty stemmed from changing ships and therefore the system's environment. At times, it was not known whether the system could be positioned on the bridge or placed in a ship laboratory, whether connection to the ship's network would be wireless or by cable, and/or whether the system could be networked into the ship's GPS system or would need to determine position independent of the ship's systems. With each cruise, the system design evolved to absorb the effects of variation in environment. Incorporating contingencies made the system more configurable. Thus using simple text configuration files to replace hard coded options in the system allowed support technicians to change the configuration of the event logger on the fly. The system was made more mutable, less rigid as explained by one of the designers.

FINDINGS AND FUTURE DIRECTIONS

The primary finding of the design project has been the recognition of the form iterative design has taken and the value of an open design process. This openness has led to recognition of the importance of configurability as the event logger system has been deployed in different environments. With the open collaborative stance, each

In this context, it has seemed natural to adopt a loosely **iterative design process**.

Quote #3. A lead designer discusses flexibility: "the configuration file [was] flexible so you have lab events, you have bridge events, you have marine mammal events…. And every computer running the event log can have their own selections to choose from. And they essentially just share the position file or data and the event number gets updated."

Figure 4. Iterative design process in the design studio.

iteration has allowed for the possibility of extending the circle of designers. After each iteration, the definition of the event logger unfolds. In a sense, one could say that this open stance allowed the variability in the system's environment to have a voice as sources of action in the design process (Latour 1987). Each cruise has represented an opportunity to learn from snags and successes that were encountered. *In incorporating multiple voices, the event logger had become an actor in its own right.*

From a design perspective, these opportunities can be seen as windows into articulating much of the invisible work (Star and Strauss, 1999; Suchman 1995; Clement 1993) that is required for the success of the event logger system. On a more fundamental level, we could say that this support work is necessary for the event logger to be an event logger instead a collection of components. While uncertainties and breakdowns can bring attention to tools, instead of the processes in which they are used, they can also be viewed as opportunities to gain valuable feedback in the design process (Suchman, 2000).

In the more concrete case of the event logger as the openness to collaboration has led to many valuable insights. The primary insight has involved the recognition of the importance of flexibility in bridging local infrastructures—of building the event logger system in a way that it can be easily configurable to meet the multiple demands of actors approaching it (or the cruises) from different organizational milieus.

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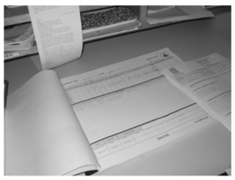

Figure 5. A handwritten paper bridge log.

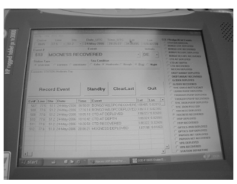

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Figure 1. An ocean research vessel – a sea going laboratory equipped with an event logger.

The question driving the current review is, what are the lessons we have learned in the process of deploying this technology - in a variety of shipboard environments - that contribute to bridging differing organizational

One of the **primary goals** of this project has been to provide for the possibility of interoperable data while respecting differences in data management practices that serve the

backgrounds and with a variety of research interests brought together by a shared interest in describing and understanding the marine system off the California coast. Perhaps unsurprisingly, the data collected by different scientific teams and particularly across organizational boundaries require extensive work to be rendered commensurable. Bowker (2000, 2006) describes precisely this kind of work in efforts to and discipline. Seemingly small differences in how data is gathered in the field become progressively difficult to reconcile as the ship data returns to land and is carried by investigators into their labs. As cruise experiences fade into stories exchanged in conversational encounters, such discrepancies become progressively more difficult to resolve as they become integral to subsequent data handling practices.

Problems that might appear to be mundane—determining the sequence in which measurements are taken—are key to bringing measurements into a shared data repository. Yet, the time stamp associated with shipboard measurements is subject to varying configurations - from ships' dual global positioning satellite systems (GPS) to differing arrangements in GPS receiving equipment as well as to a bevy of unsynchronized shipboard computer clocks. So time is an issue.

Another issue is space--the position at which measurements are taken. Investigators are from different institutions where each organization has a distinct way of considering and recording a measurement. Established stations with unique names mark the location where measurements are to be taken. On the face of it reconciling two station-naming conventions appears straightforward, simply determine the latitude and longitude for a given station or set of stations in order to provde an accurate representation of location. Still needed, however, are the mechanisms that tie an objective location to the subjective work done by stations. Here stations represent a subjective notion that encompasses field experiences and evokes memories. Further, they are easily pronounced and tied to human recall. And yet, there is the issue of how measurements taken *near* a given station are to be lumped into or related to the category of that station. These differences could be characterized as different frames of reference or could be considered as a gap between metrologies (Latour 1987) embedded in each organization.

These kinds of issues are not limited to the gaps between organizations. They can be found between groups of researchers operating within the same organization as well. In the current case the gap between physical and biological oceanography finds a local correlate in the gap between researchers affiliated with Scripps Institution of Oceanography at the University of California, San Diego (SIO/UCSD) and the National Ocean and Atmospheric Administration's Southwest Fisheries Science Center (NOAA/SWFSC), a fisheries management laboratory. Though both groups of researchers in question comprise jointly the California Cooperative Oceanic Fisheries Investigations (or CalCOFI) program, the organizational gap between SIO and NOAA lines up with the larger divide between physical and biological oceanography and the measurement strategies associated with each. Organizational conventions appear, at the same time, as conventions in data management *and* metrology.

10 Appendix: Ocean Informatics Posters: Technical and Conceptual

Posters are summarized in the table below. Brief descriptions follow the table, grouped into three sections: A) about Ocean Informatics, B) by Ocean Informatics: Conceptual, and C) by Ocean Informatics: Technical. Posters are online: http://oceaninformatics.ucsd.edu/media-gallery/?id=1. Posters are given unique identifiers in sequential order by date.

Date	Title	Description	Creator
2003-09-18	Palmer LTER: Information Flow and Management	Organizational repositories are needed today to address the needs of scientific information management. Given the social aspects of information, building useful information systems requires multi-faceted infrastructure.	Karen Baker, Anna Gold, Frank Sudholt, Helena Karasti, Geoffrey Bowker
2005-12-05	CalCOFI Data Management: Overview and Reflection	A CalCOFI White Paper (2005) provides an overview of the current state of data and its management within the California Cooperative Ocean Fisheries Investigations (CalCOFI) program.	Karen Baker, Karen Stocks
2005-12-06	Initiating the Data Dialogue: 2005 CalCOFI Conference Interactive Poster	The interactions surrounding the 2005 CalCOFI Data Management poster are captured through photographs of updates and additions made to the poster during the poster session of the annual conference.	Karen Baker
2006-04-01	Ocean Informatics: Conceptual Framework for Marine Science Information Management	The work of Ocean Informatics is represented at the union of oceanography, information science and social science domains. Participants range from data and information managers to technical specialists, archivists, scientific researchers, educators.	Karen Baker, Jerry Wanetick, Shaun Haber, Lynn Jarmey, Mason Kortz, Florence Millerand, Jesse Powell, Jim Wilkinson, Robert Thombley, Julie Thomas, Beth Simmons
2006-09-20	CCE LTER: Information Management (2004-2006)	The California Current Ecosystem information management efforts were launched with inquiries into existing data practices. This was followed by design, development and deployment of elements of an information infrastructure.	Karen Baker, Lynn Yarmey, Mason Kortz, Jerome Wanetick
2006-09-20	LTER: Research in Infrastructure Studies: Social & Organizational Perspectives on Ecological Data Management	In the mist of major changes in ecological data collecting, managing and sharing, an interdisciplinary team of information, ecological, and social scientists has been brought togeher at LTER PAL and CCE sites to facilitate the growth from site-based to larger-scale efforts.	Florence Millerand and Karen Baker
2006-09-20	Palmer LTER: Design of a Queriable Ocean Information System	Field data, originating with domain understandings and practices that shape sampling and collection, has informed development of the PAL LTER information system. In becoming digitally preserved, data capture may in turn be influenced bn information system work.	Karen Baker and Shaun Haber
2006-09-20	LTER IM Articulation Work: Developing Community Web Recommendatiaons	Over the past two years, the Web Site Design Recommendations Working Group developed recommendations for web sites in response to challenges of first generation LTER web sites. They worked to align a set of social, technical and organizational elements.*	Nicole Kaplan, Karen Baker, Barbara Benson, John Campbell, Corinna Gries, James Laudre, Jeanine McGann, Eda Melendez-
2006-12-04	CalCOFI: An Oceanographic Event Logger	Local data management, informed by field sampling and data use, supports community coordination at the interface of data collection and data curation. An oceanographic event logger recently deployed on a series of research cruises extends data management to the field.	James Wilkinson, Karen Baker
2007-08-02	LTER: Data Integration in the Decade of Synthesis	As data availability, findability, and even queriability become more ubiquitous, the need to make sense of data from multiple, disparate sources increases. Data integration and data synthesis allow extension of the scope of data beyond local use.	Mason Kortz, Lynn Yarmey, James Conners, Karen Baker
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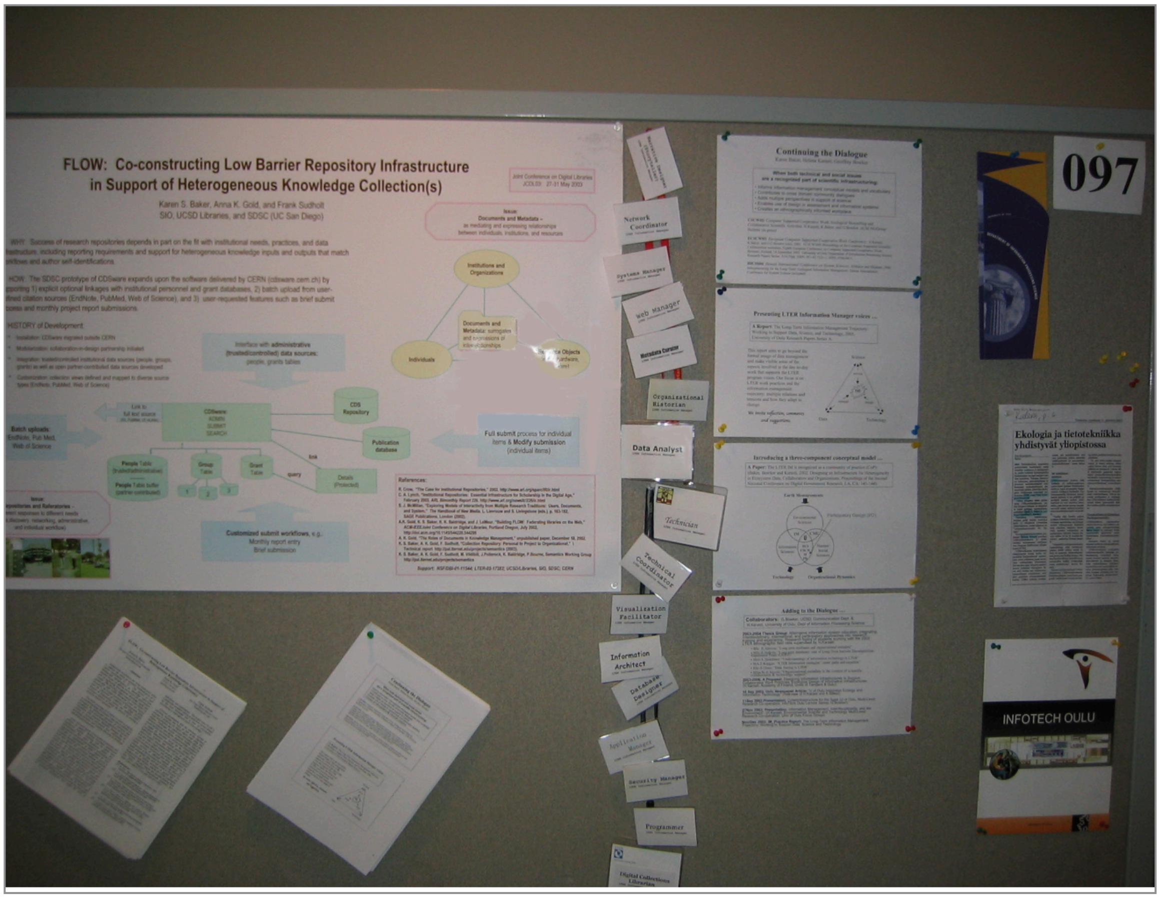
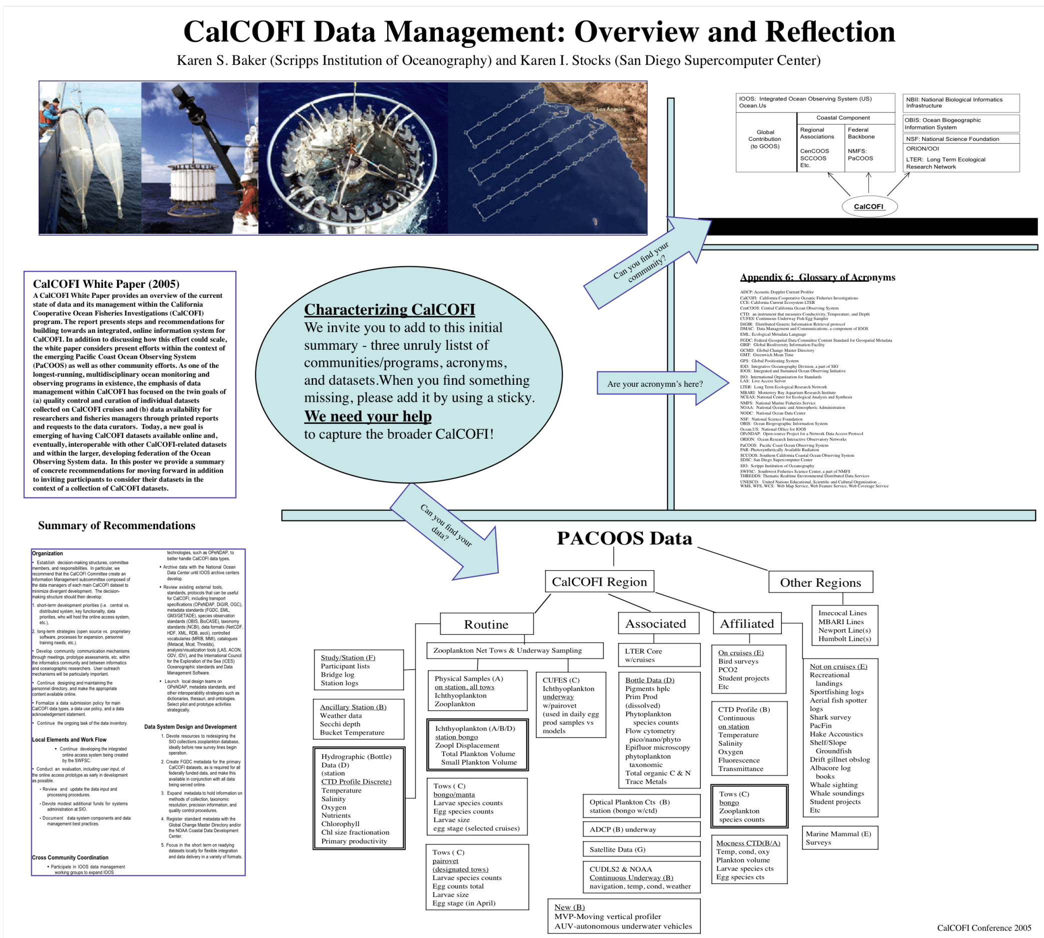
2009-09-14	LTER Unit Working Group Projects: Dictionary and Registry	Units of measurement are a fundamental element of scientific discourse and data integration. The LTER Unit Working Group has developed two initiatives to promote consistent use of units throughout the network including the Unit Dictionary.	Mason Kortz, Lynn Yarmey, James Conners, Todd Ackerman, Karen Baker
2009-12-07	CalCOFI Toward Integrated Data: Web Access to CalCOFI Ichthyoplankton Data	IchthyoDB (http://oceaninformatics.ucsd.edu/ichthyoplankton) is a queriable web application that provides data about abundance of fish eggs and larvae sampled as part of the CalCOFI program.	Karen Baker, Mason Kortz, Ed Weber, Rich Charter, Susie Jacobson, Sam McClatchie, Bill Watson, Tony Koslow

1
Poster date: 2003-09-18
Title: Palmer LTER: Information Flow and Management
Description: Organizational repositories are needed today to address the needs of scientific information management. Given the social aspects of information, building useful information systems requires multi-faceted infrastructure.
Authors: Karen Baker, Anna Gold, Frank Sudholt, Helena Karasti, Geoffrey Bowker



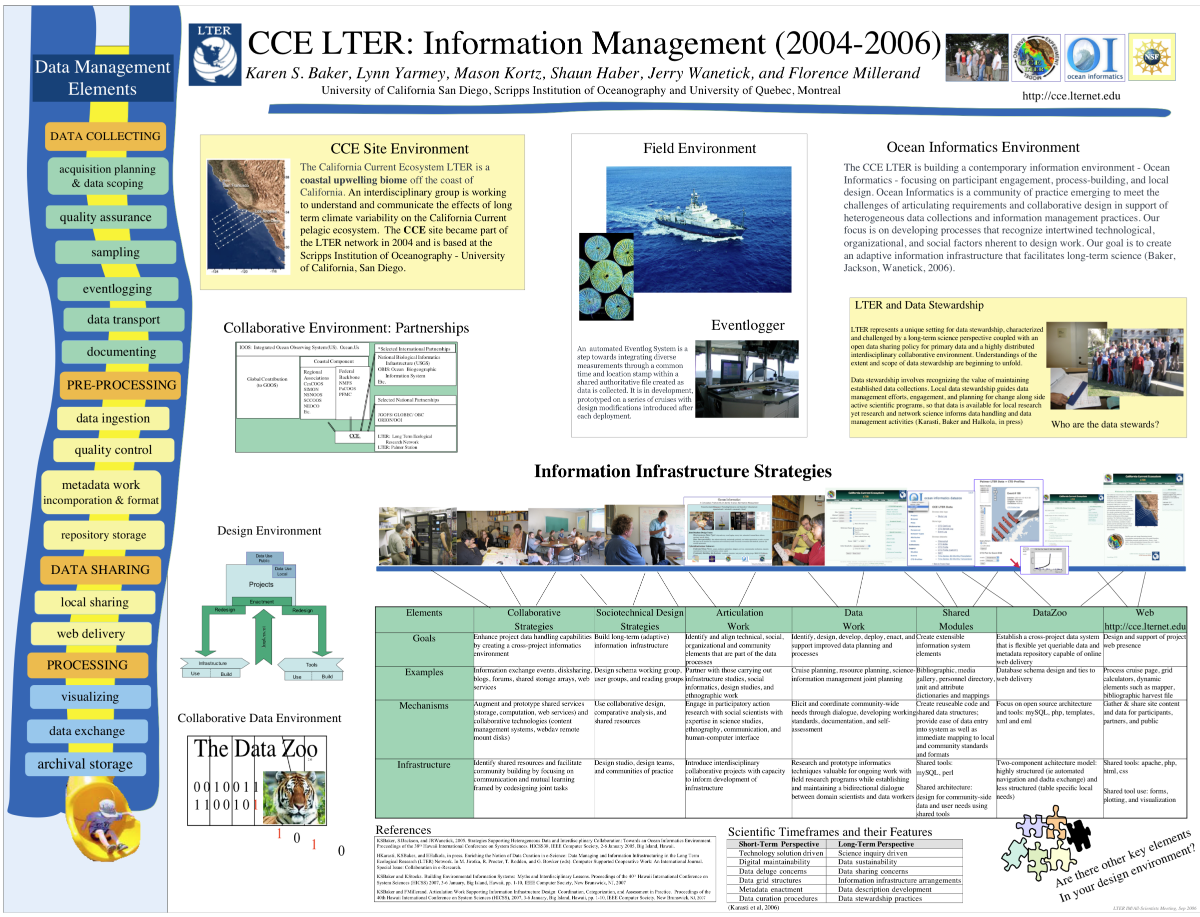
2
Poster date: 2005-12-05
Title: CalCOFI Data Management: Overview and Reflection
Description: A CalCOFI White Paper (2005) provides an overview of the current state of data and its management within the California Cooperative Ocean Fisheries Investigations (CalCOFI) program.
Authors: Karen Baker, Karen Stocks



3
Poster date: 2005-12-06
Title: Initiating the Data Dialogue: 2005 CalCOFI Conference Interactive Poster
Description: The interactions surrounding the 2005 CalCOFI Data Management poster are captured through photographs of updates and additions made to the poster during the poster session of the annual conference.
Authors: Karen Baker

4
Poster date: 2006-04-01
Title: Ocean Informatics: Conceptual Framework for Marine Science Information Management
Description: The work of Ocean Informatics is represented. Participants range from data and information managers to technical specialists, archivists, scientific researchers, educators.
Authors: Karen Baker, Jerry Wanetick, Shaun Haber, Lynn Jarmey, Mason Kortz, Florence Millerand, Jesse Powell, Jim Wilkinson, Robert Thombley, Julie Thomas, Beth Simmons

5
Poster date: 2006-09-20
Title: CCE LTER: Information Management (2004-2006)
Description: The California Current Ecosystem information management efforts were launched with inquiries into existing data practices. This was followed by design, development and deployment of elements of an information infrastructure.
Authors: Karen Baker, Lynn Yarmey, Mason Kortz, Jerome Wanetick



6
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Description: In the mist of major changes in ecological data collecting, managing and sharing, an interdisciplinary team of information, ecological, and social scientists has been brought togeher at LTER PAL and CCE sites to facilitate the growth from site-based to larger-scale efforts.
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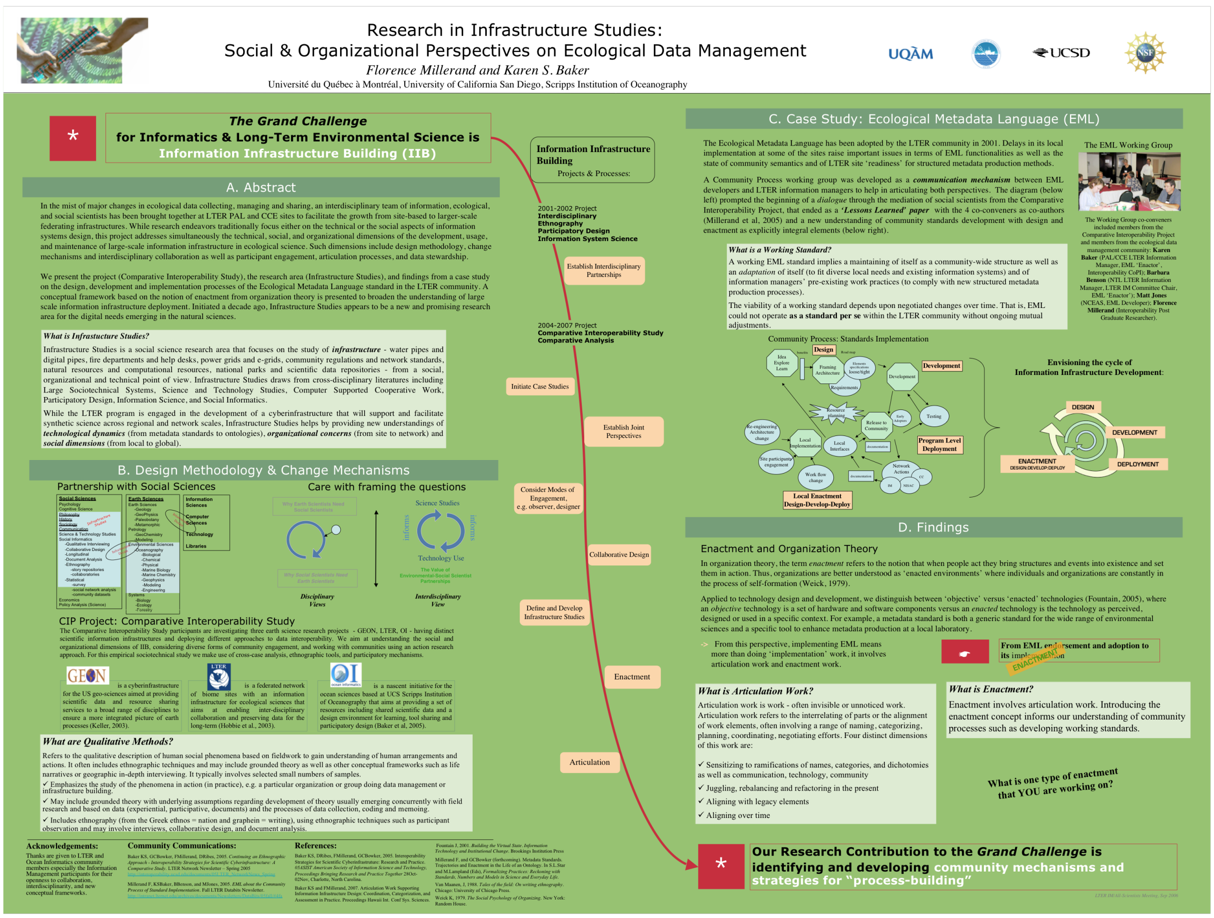
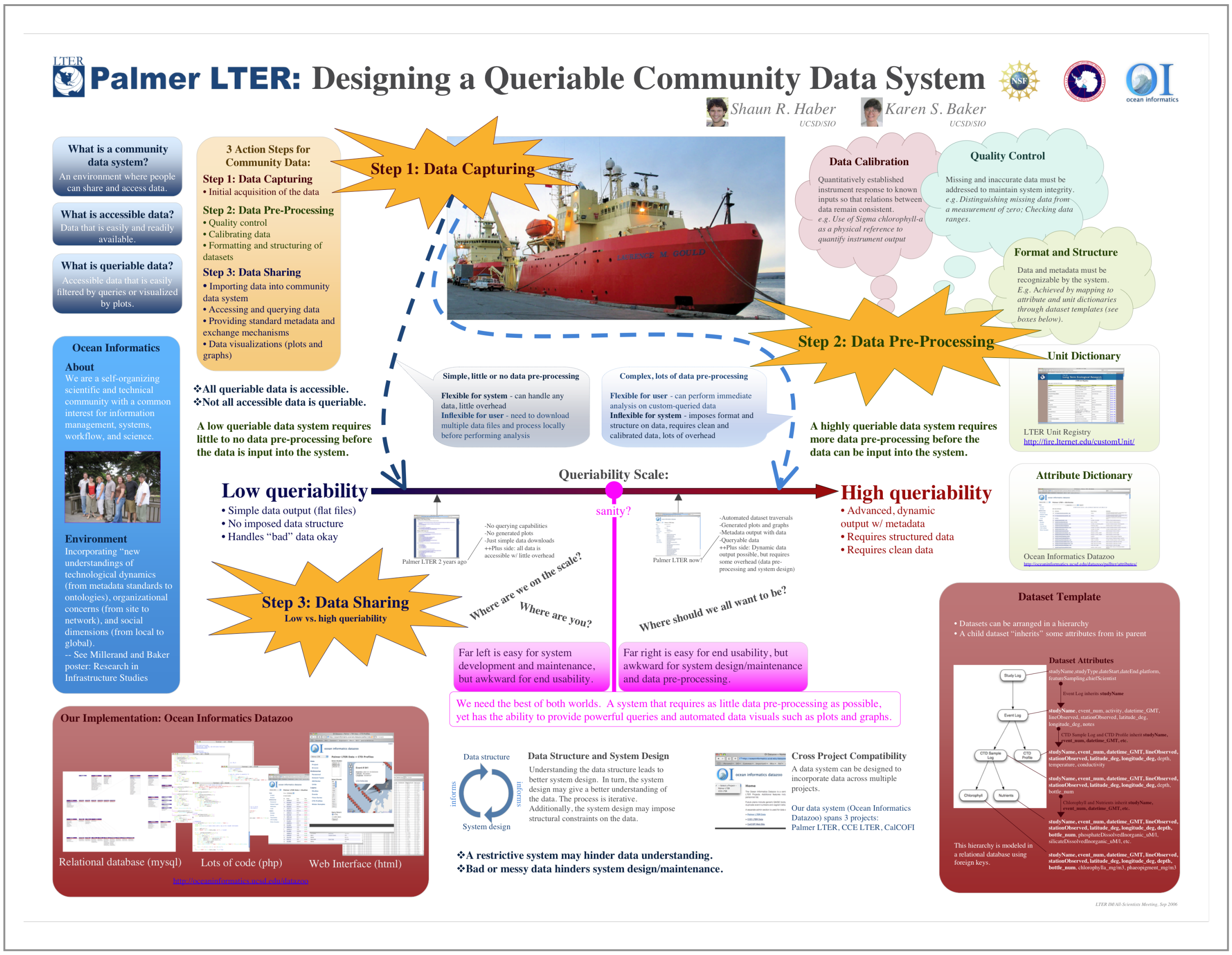
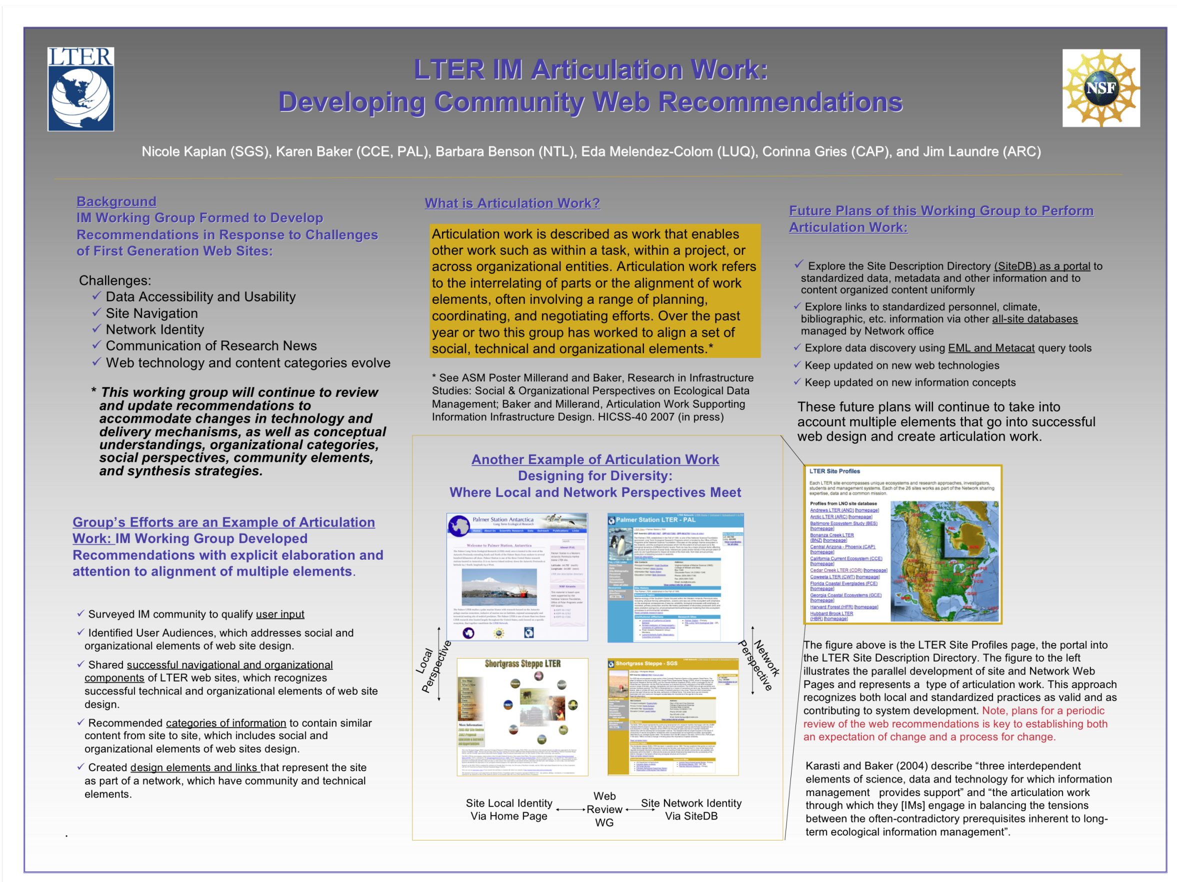


7
Poster date: 2006-09-20
Title: Palmer LTER: Design of a Queriable Ocean Information System
Description: Field data, originating with domain understandings and practices that shape sampling and collection, has informed development of the PAL LTER information system. In becoming digitally preserved, data capture may in turn be influenced bn information system work.
Authors: Karen Baker and Shaun Haber



8
Poster date: 2006-09-20
Title: LTER IM Articulation Work: Developing Community Web Recommendations
Description: Over the past two years, the Web Site Design Recommendations Working Group developed recommendations for web sites in response to challenges of first generation LTER web sites. They worked to align a set of social, technical and organizational elements.*
Authors: Nicole Kaplan, Karen Baker, Barbara Benson, John Campbell, Corinna Gries, James Laudre, Jeanine McGann, Eda Melendez-Colom, Marshall
White



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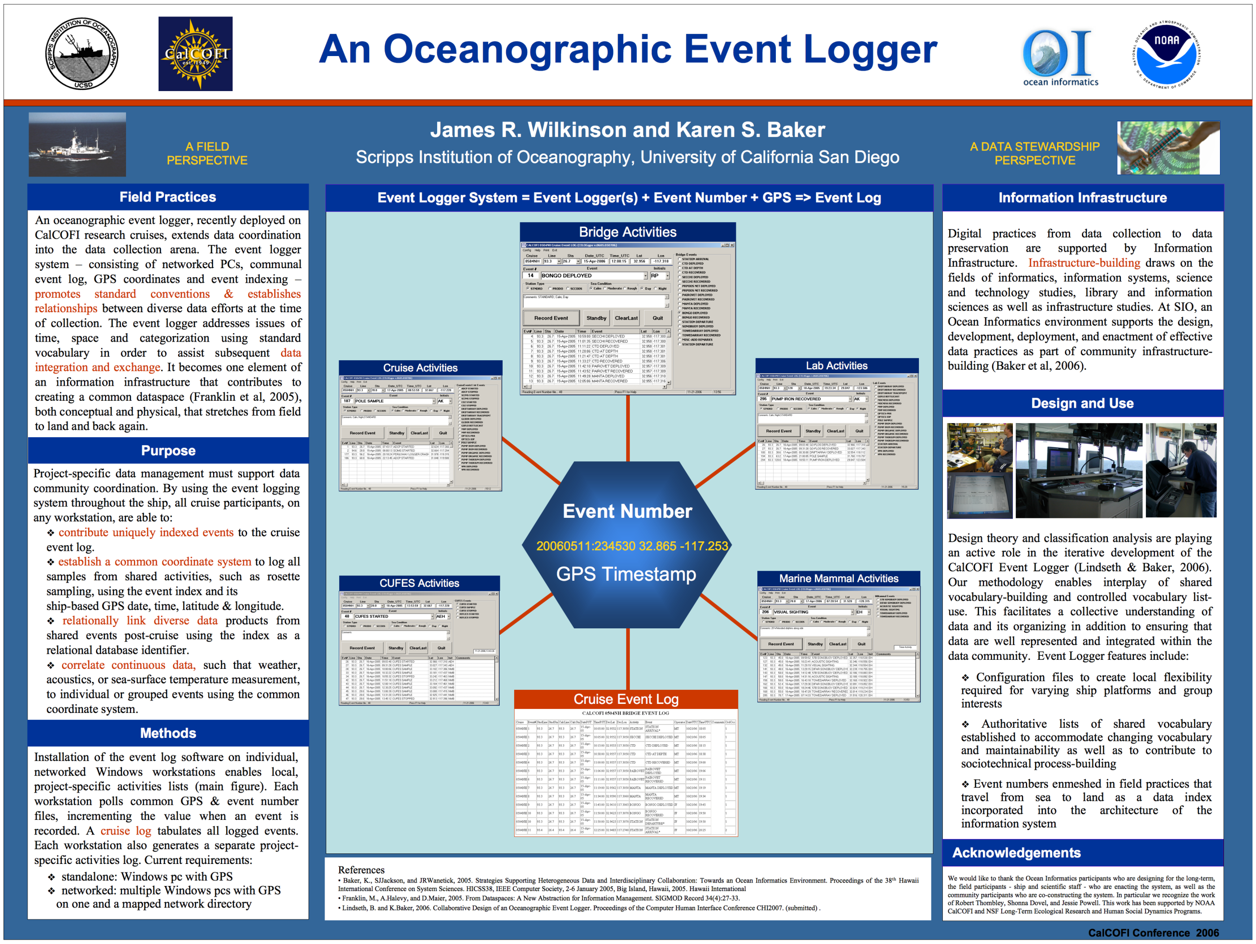

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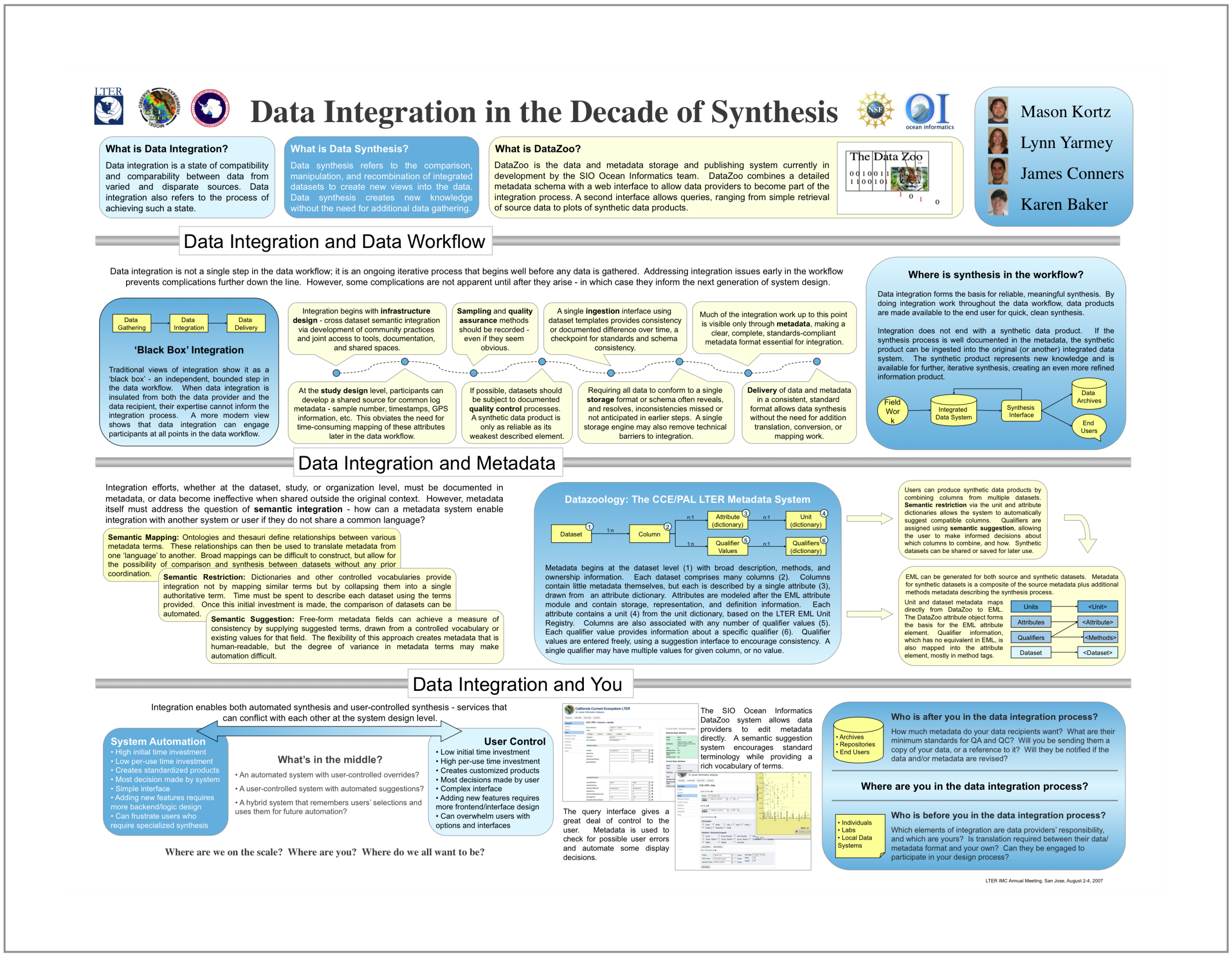

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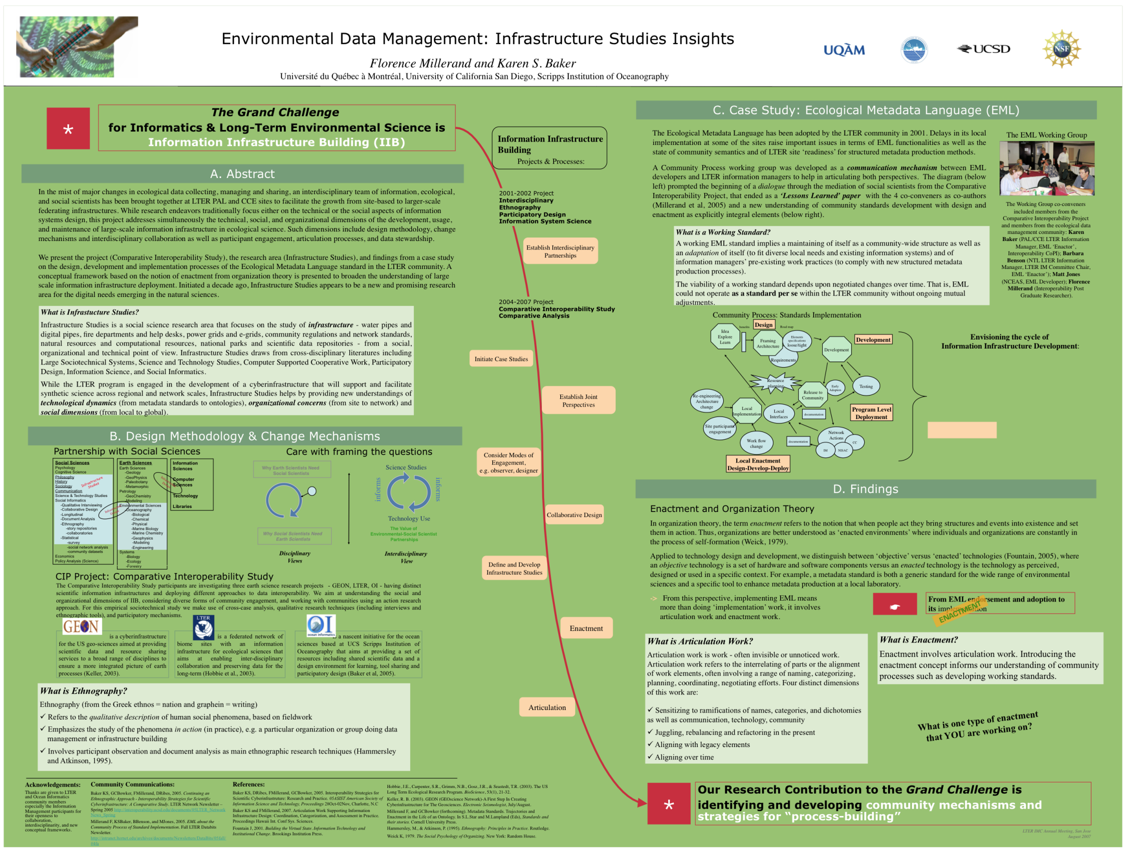

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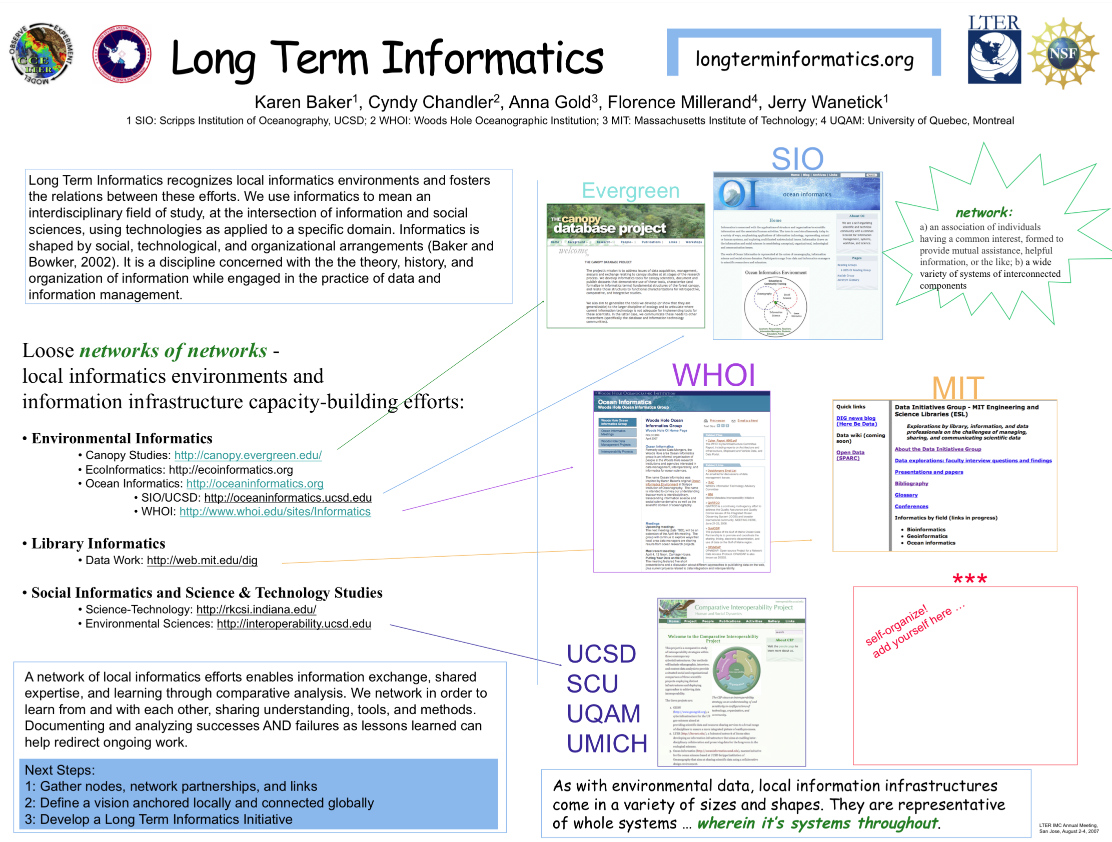

13
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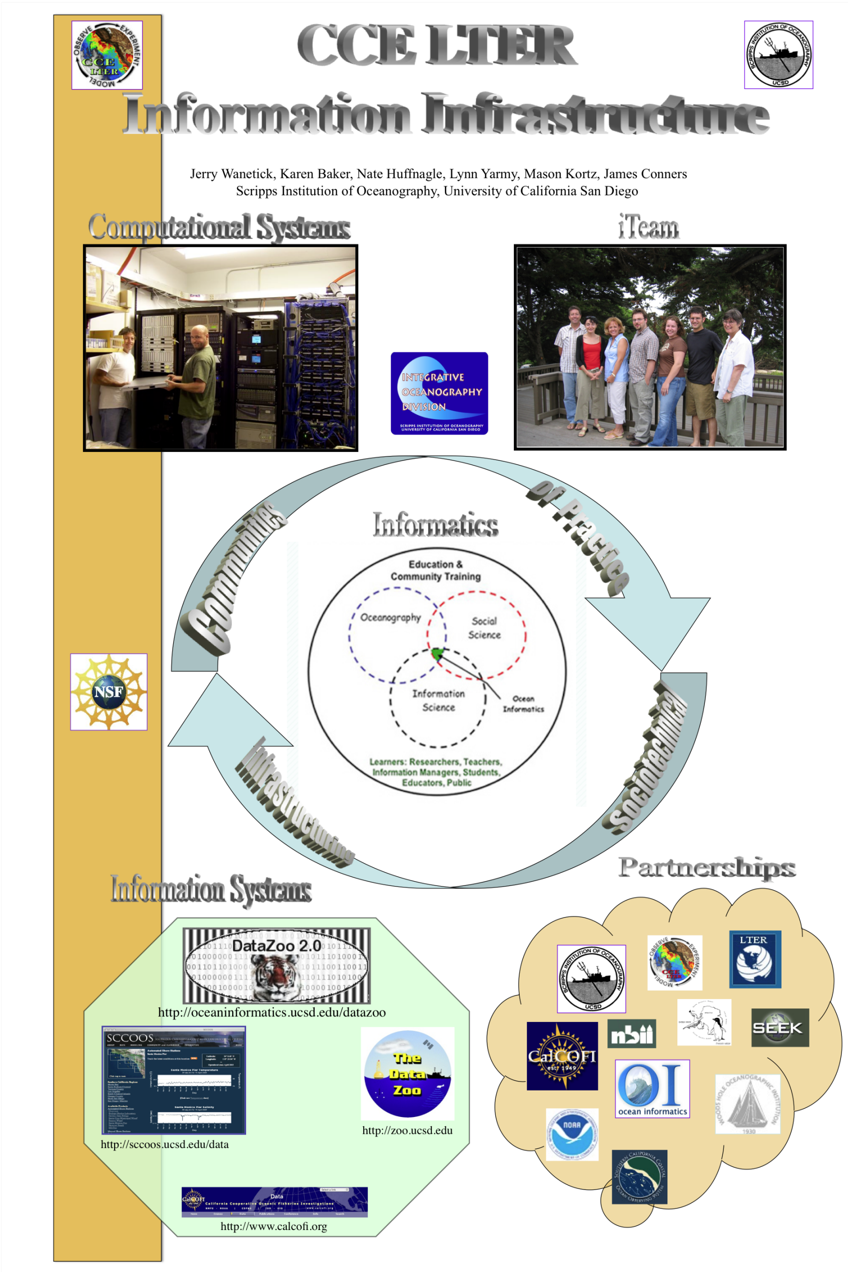
CCE LTER
Information Infrastructure
Jerry Wanetick, Karen Baker, Nate Huffnagle, Lynn Yarmy, Mason Kortz, James Conners
Scripps Institution of Oceanography, University of California San Diego
Computational Systems
iTeam
INTEGRATIVE OCEANOGRAPHY DIVISION
Communities of Practice
Informatics
Education & Community Training
Oceanography
Social Science
Information Science
Ocean Informatics
Learners: Researchers, Teachers, Information Managers, Students, Educators, Public
Sociotechnical
Infrastructuring
NSF
Information Systems
DataZoo 2.0
http://oceaninformatics.ucsd.edu/datazoo
SCCOOS
http://sccoos.ucsd.edu/data
The Data Zoo
http://zoo.ucsd.edu
http://www.calcofi.org
Partnerships
LTER
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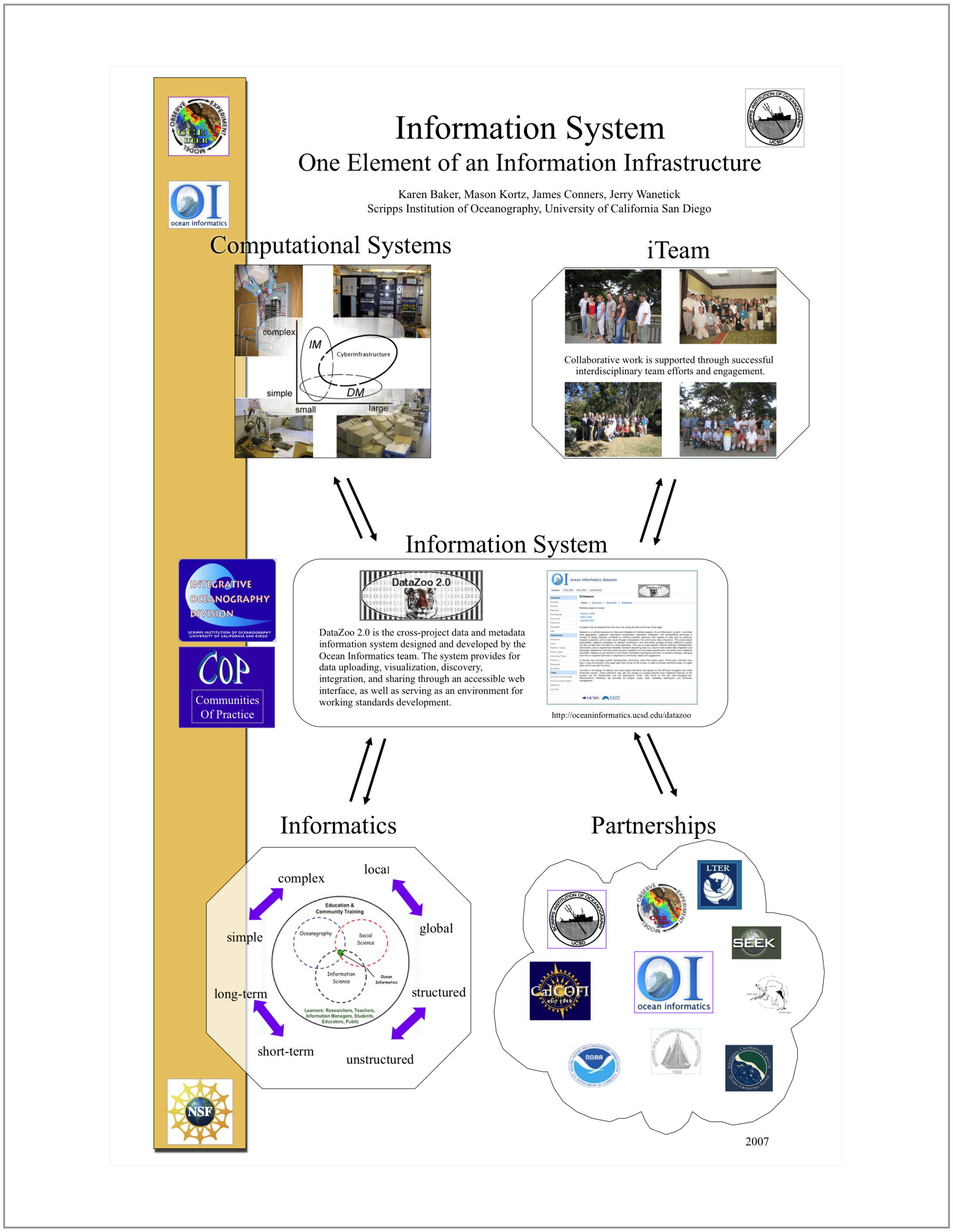

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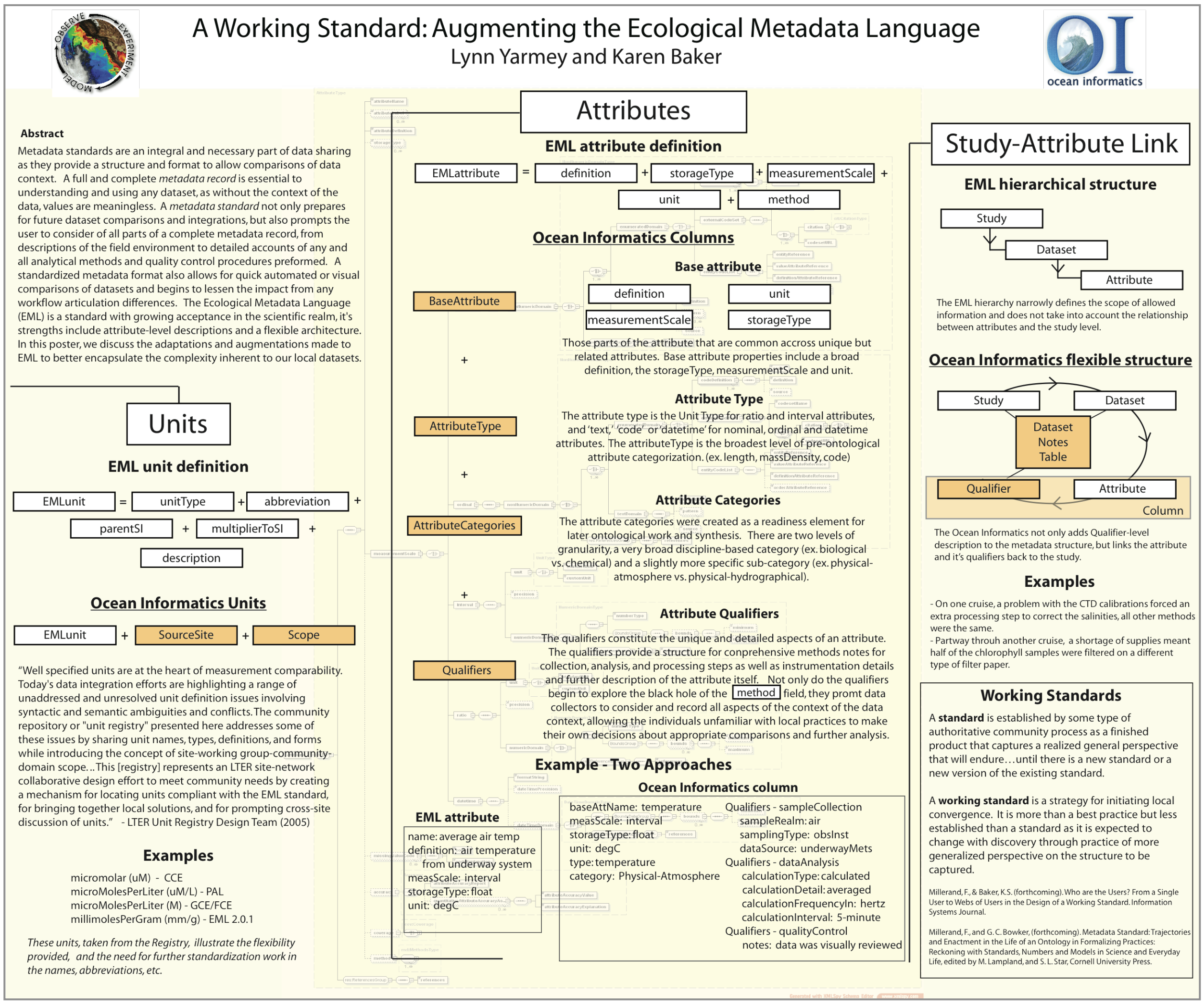

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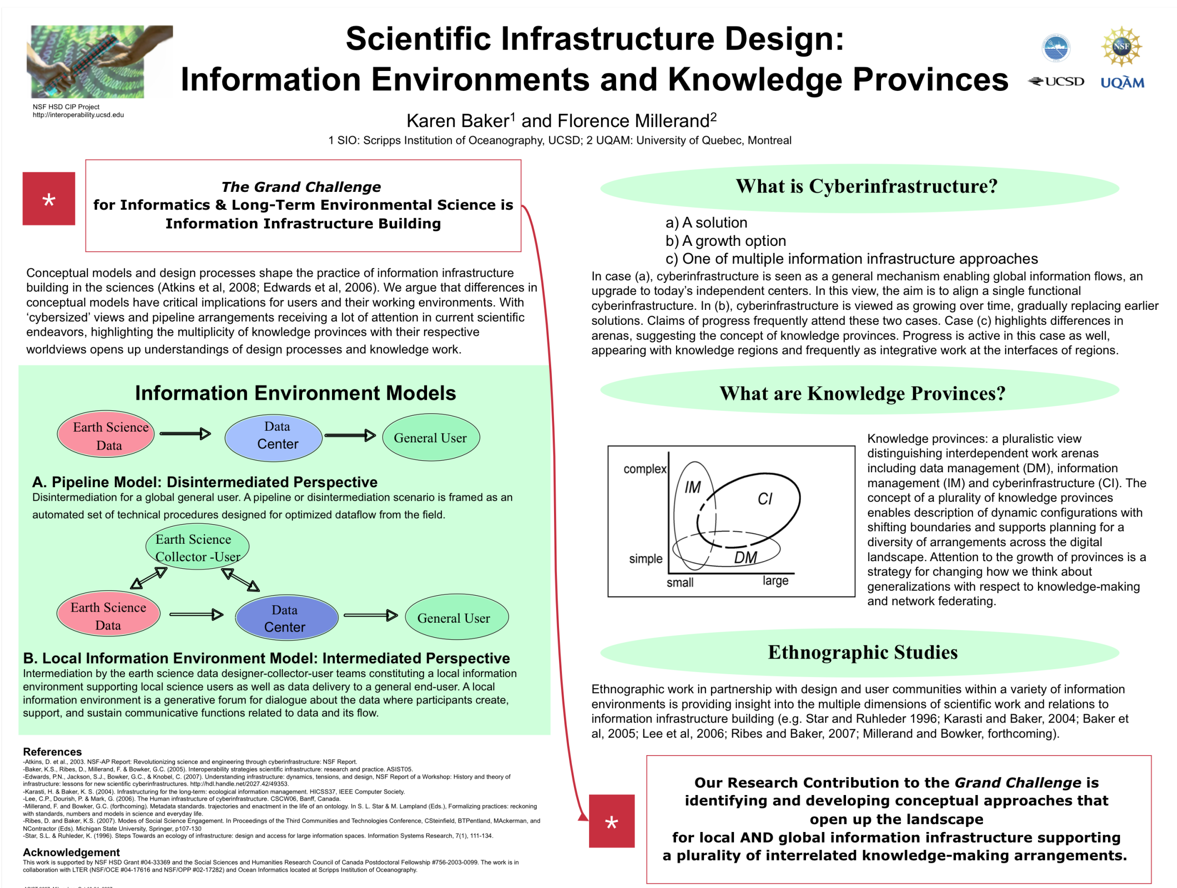

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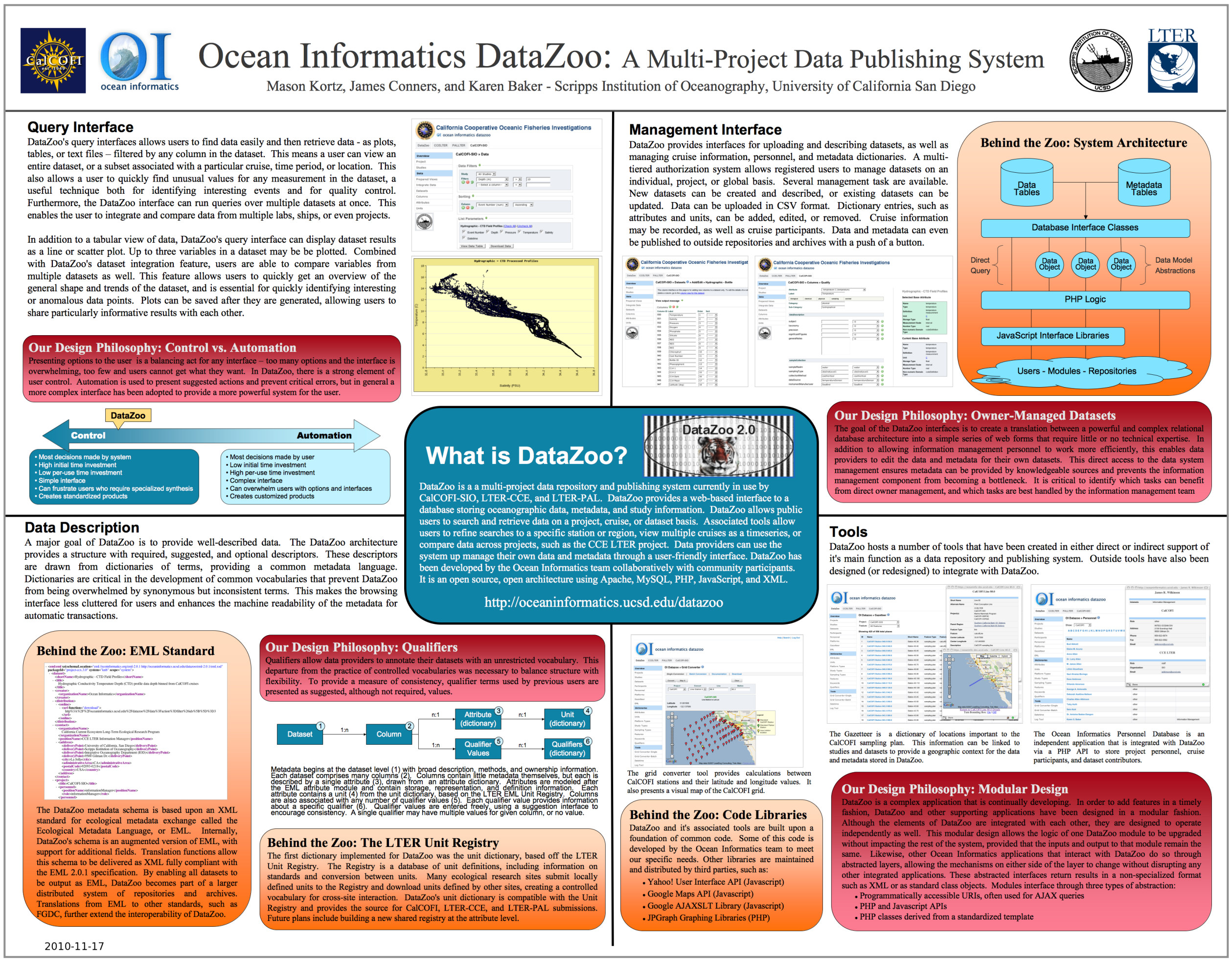

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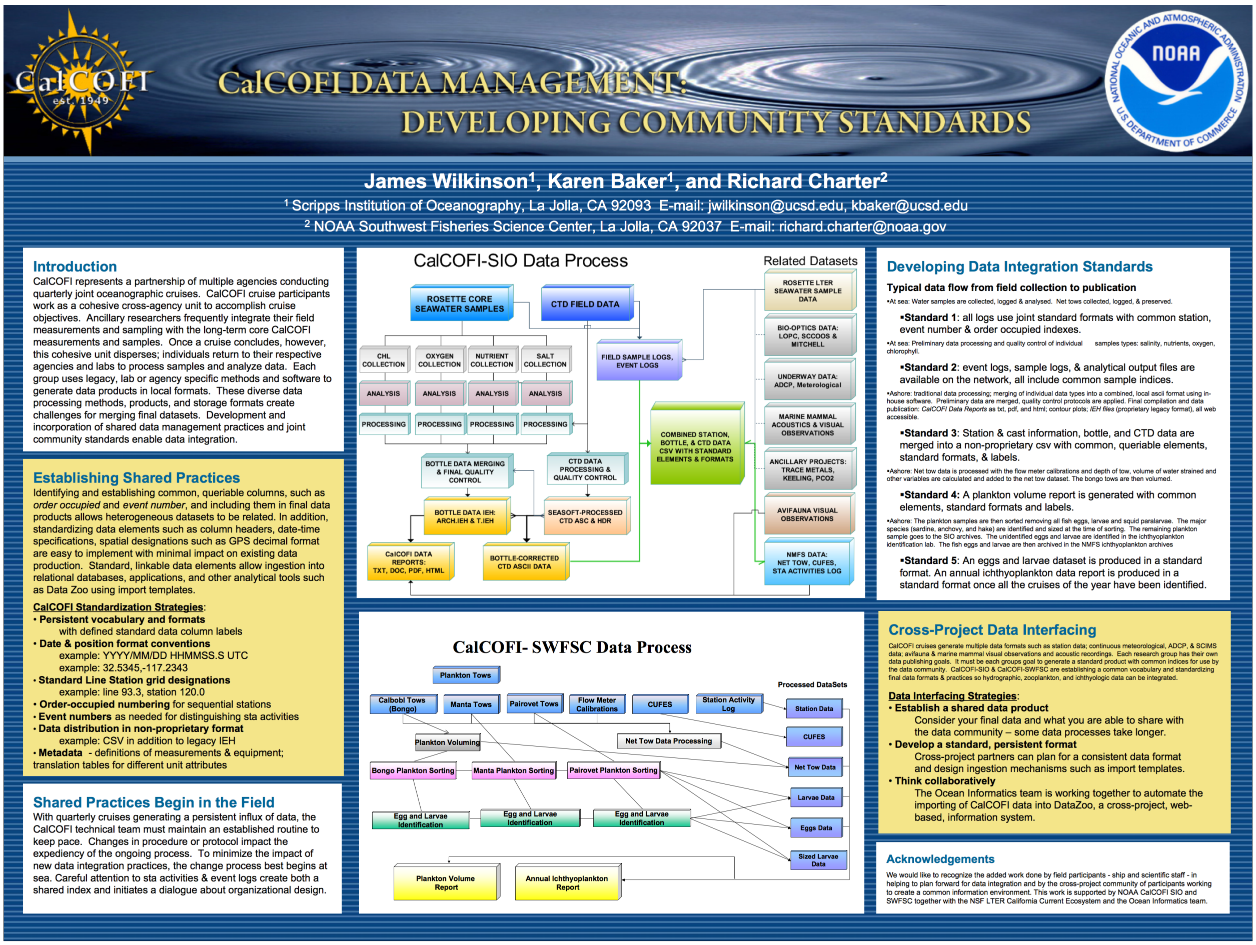

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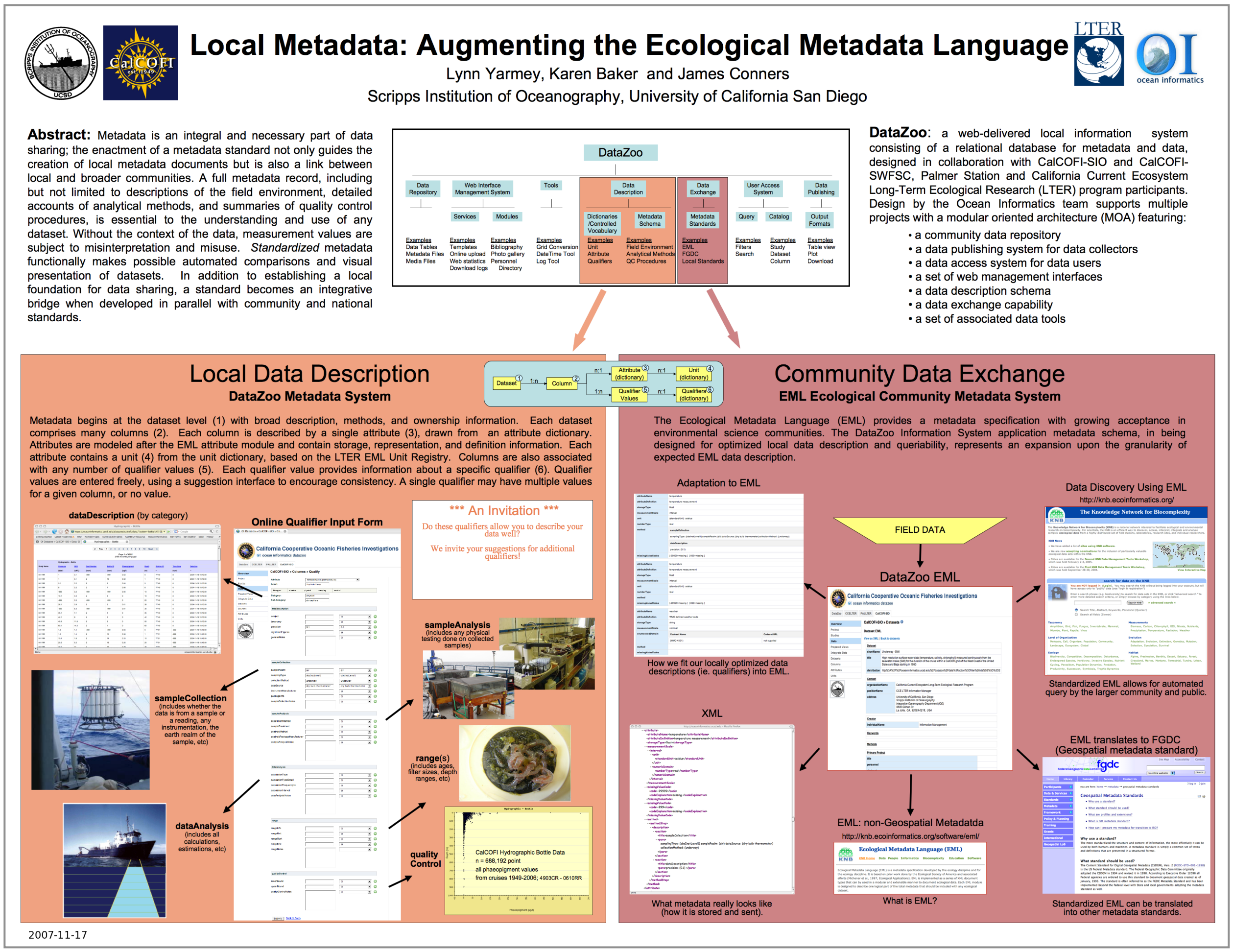

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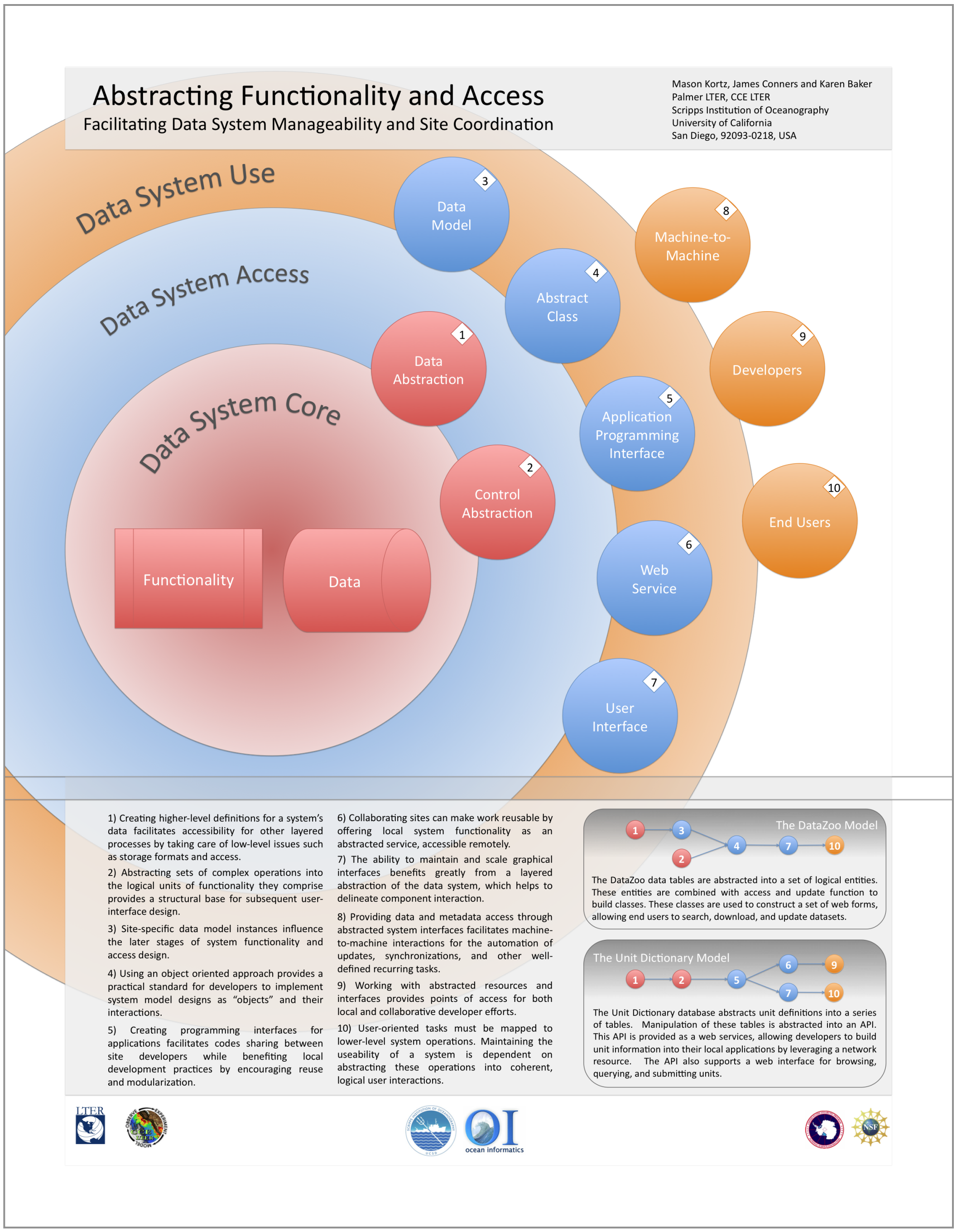

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LTER IMC Community of Practice: A Learning Environment

Karen Baker[1], Nicole Kaplan[2], Inigo San Gil[3], Margaret O'Brien[4], Florence Millerand[1], Lynn Yarmey[1]
[1]PAL & CCE LTER; [2]SGS LTER; [3]LNO; [4]SBC LTER

What are communities of practice?

"Communities of practice (CoP) are formed by people who engage in ***a process of collective learning*** in a shared domain of human endeavor, e.g., a group of engineers working on similar problems, a band of artists seeking new forms of expression, a network of surgeons exploring novel techniques, a gathering of first-time managers helping each other cope…" (Wenger, 2008).

A community of practice is not merely a group of people having the same job or a network of connections between people. Communities of practice are groups of people who share a concern or a passion for something they ***do*** and ***learn*** how to do it better as they interact regularly.

Three salient characteristics of CoP:

1. **The domain:** the CoP identity is defined by a shared domain of interest. Membership implies a **commitment** to the domain, and therefore a **shared competence** that distinguishes members from other people.
   LTER Case
   Research domain: ecology, information science, computer science
   Practice domain: informatics
   Development domain: sociotechnical systems design, collaborative design
   Communication domain: communication studies, science & technology studies, infrastructure studies

2. **The community:** Members build **relationships** that enable them to learn from each other through engaging in joint activities and discussions, and information sharing.
   LTER Case
   Relationships: working groups, LTER Information Management Committee, site-site, site-network, LTER Network Information System Advisory Committee
   Activities: annual LTER IMC meetings. best practices, collaborative design of modules & tools

3. **The practice:** A community of practice is not merely a community of interest. Members are practitioners - they are **engaged in doing the work.**
   LTER Case
   Data gathering, data organizing, data describing, data preparing, quality control, data analysis, data synthesis, data exchange, data processing, IT evaluation, informatics research, technology development, assessment, informatics research, federation inquiry, community-building, remote sensing, site-network coordination
   And more
   Working groups, module development, prototyping, articulation, negotiation, knowledge mediation, standards-making, infrastructure-building, informal and formal communication facilitation

Why our community of practice is important!

We have an organizational structure and a way of working that supports communications, a social organization for mentoring, a learning environment, a strategy for standards building, a mechanism for comparative analysis of experiences, a group identity…and more!

With this foundation, how do we approach cyberinfrastructure and change?

References
Wenger, E. (2008). Communities of practice: a brief introduction. Online Guide: http://www.ewenger.com/theory/index.htm
Karasti, H, Baker, K. (2004). Infrastructuring for the Long-Term: Ecological Information Management. XXXX
Wenger, E. McDermott, R., Snyder, W. (2002). Cultivating communities of practice: a guide to managing knowledge. Harvard Business school Press.
Wenger, E. (2001). Supporting communities of practice: a survey of community-oriented technologies. http://www.ewenger.com/tech
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EIMC 2008

22

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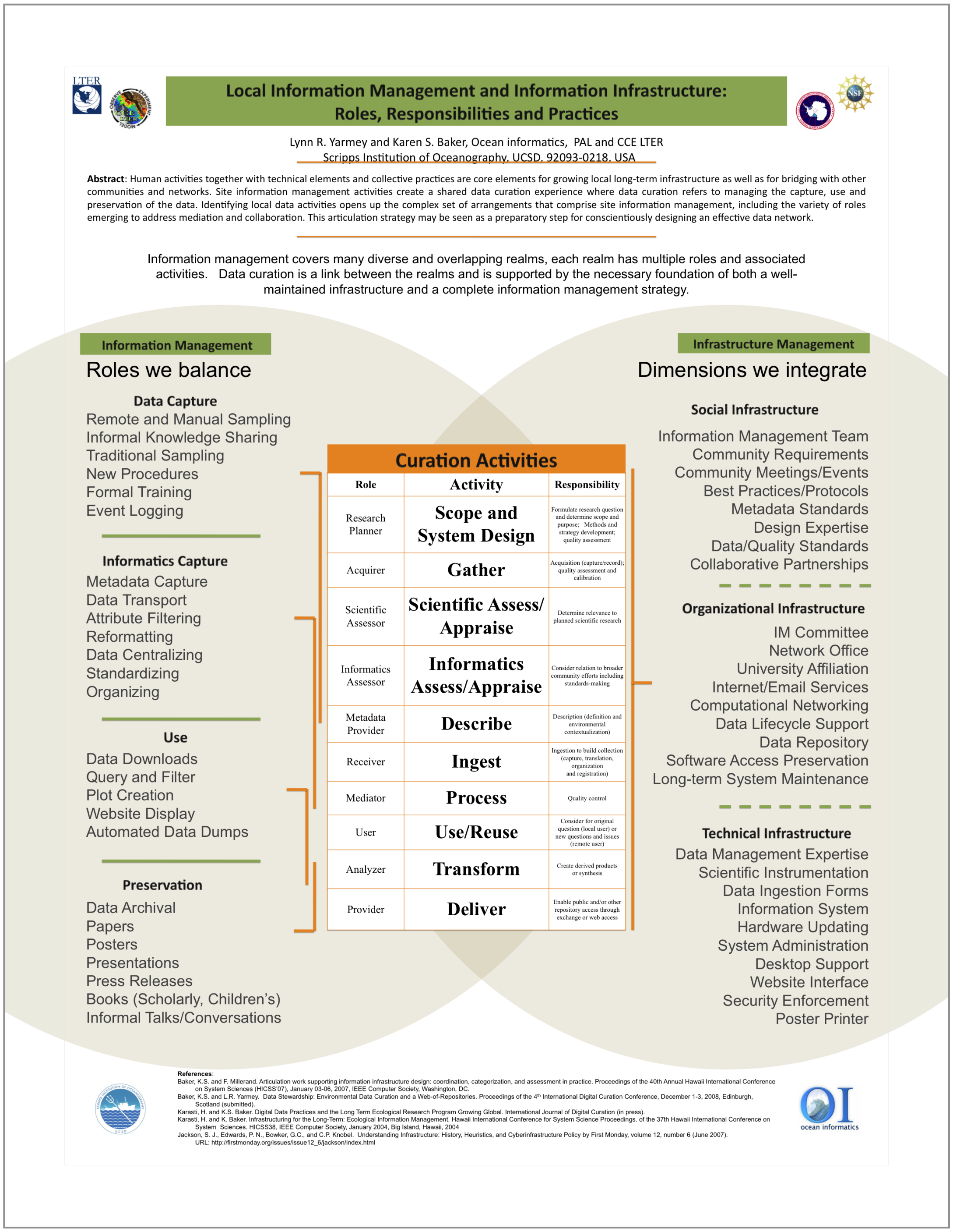

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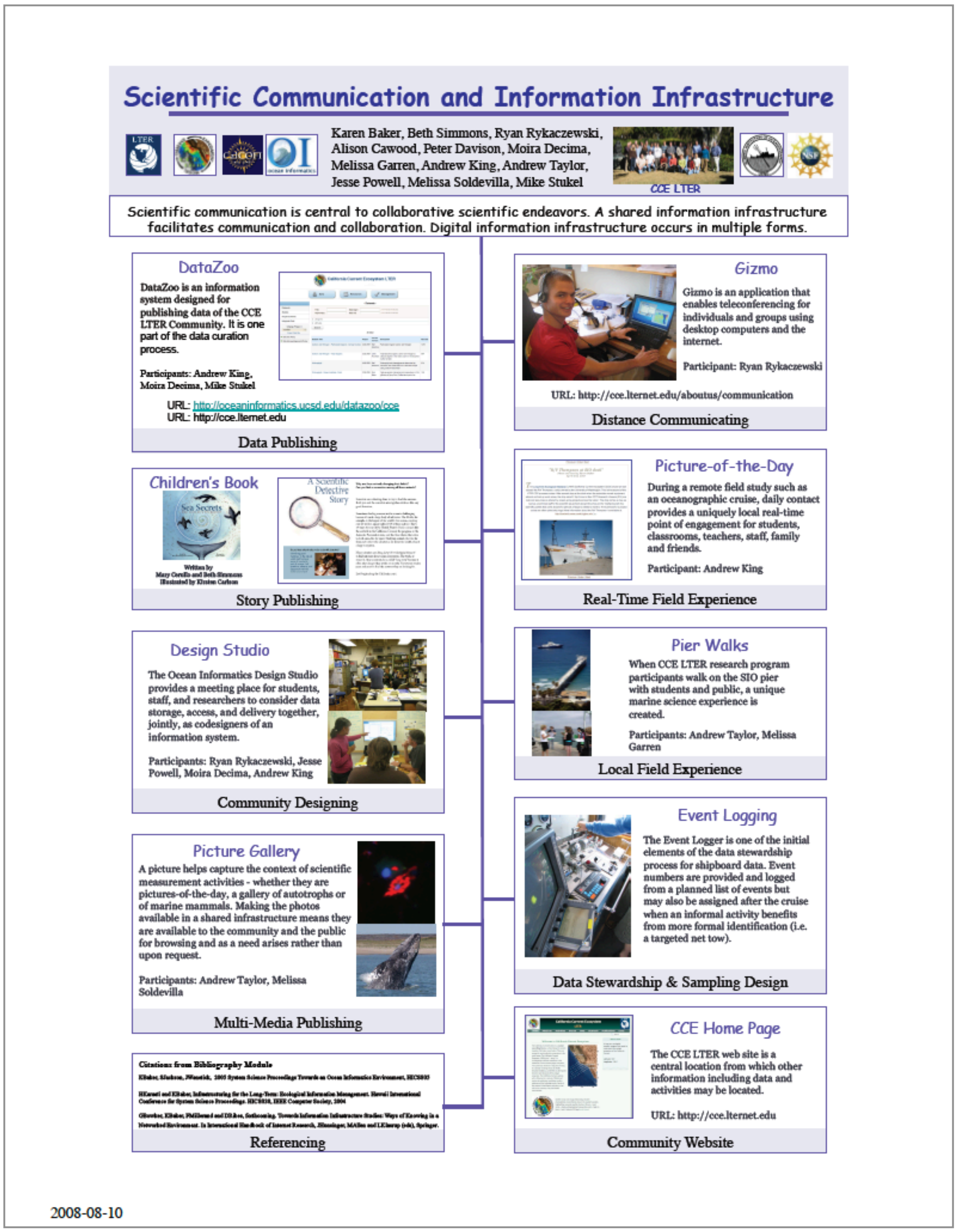

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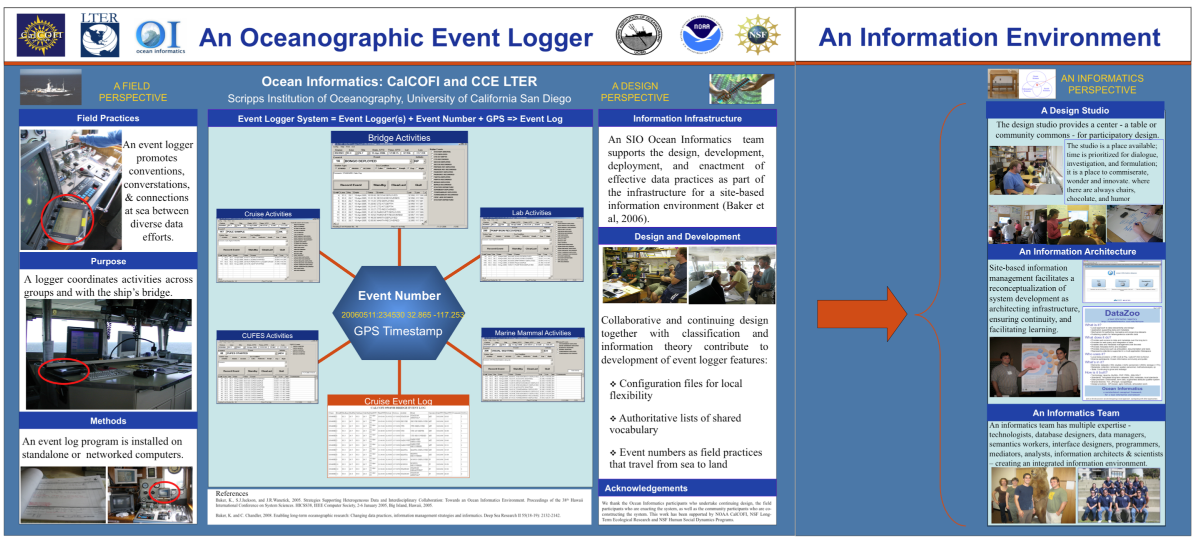

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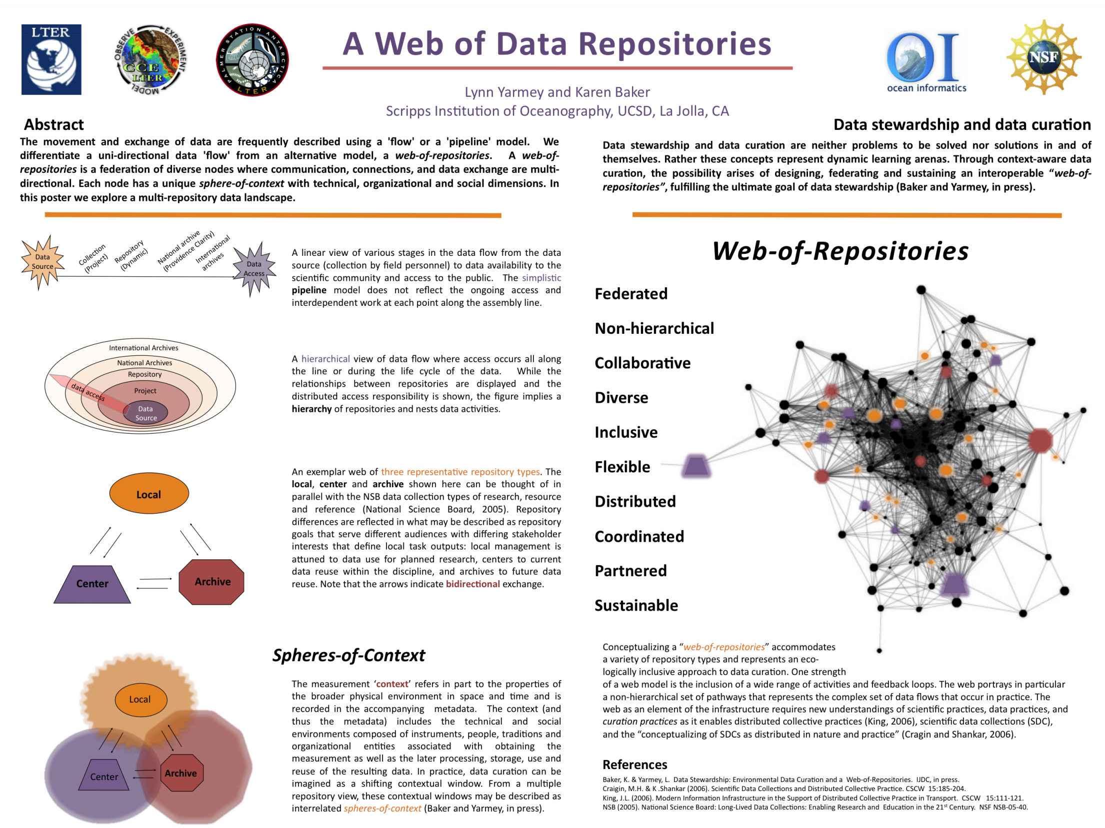

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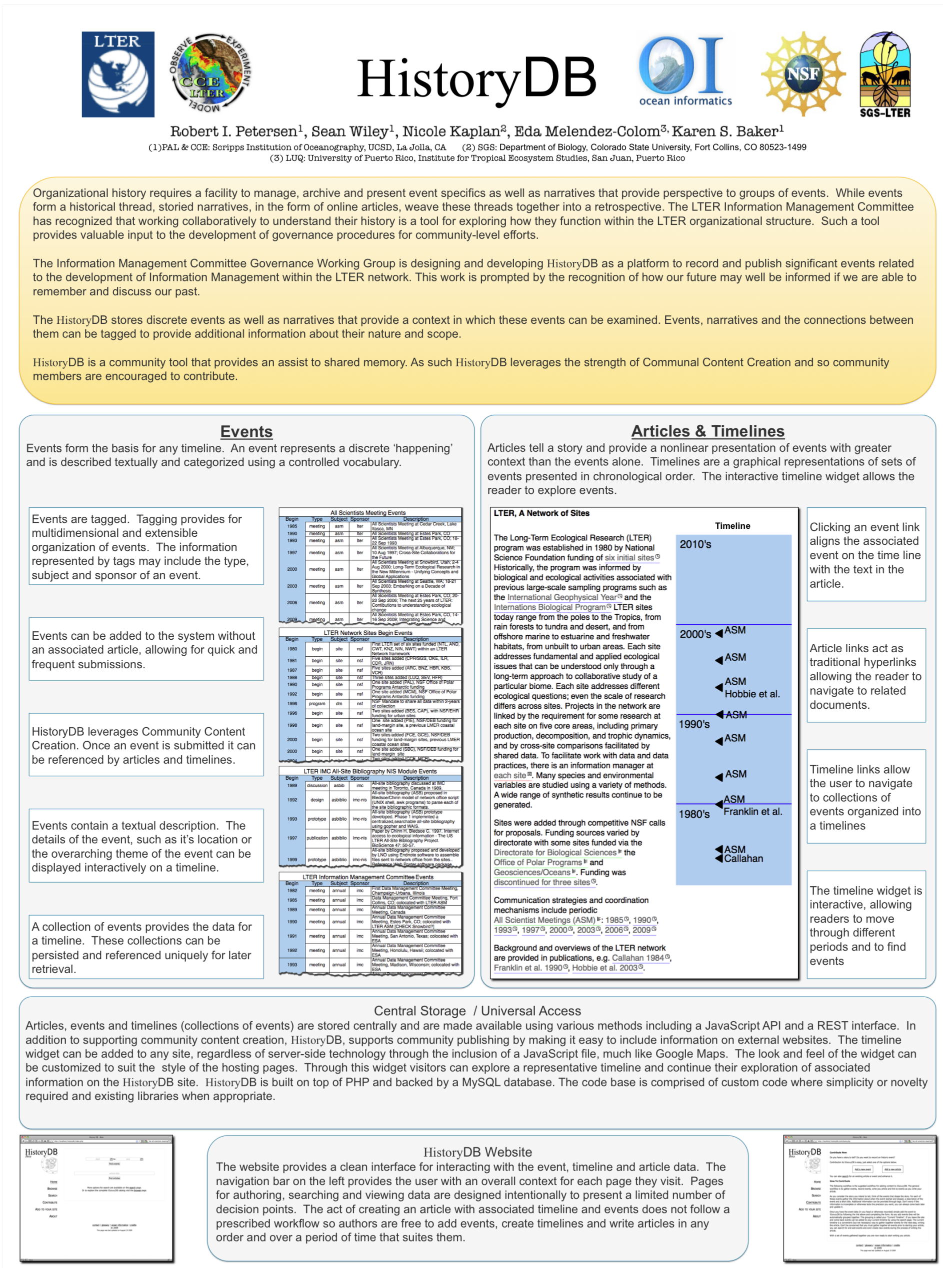

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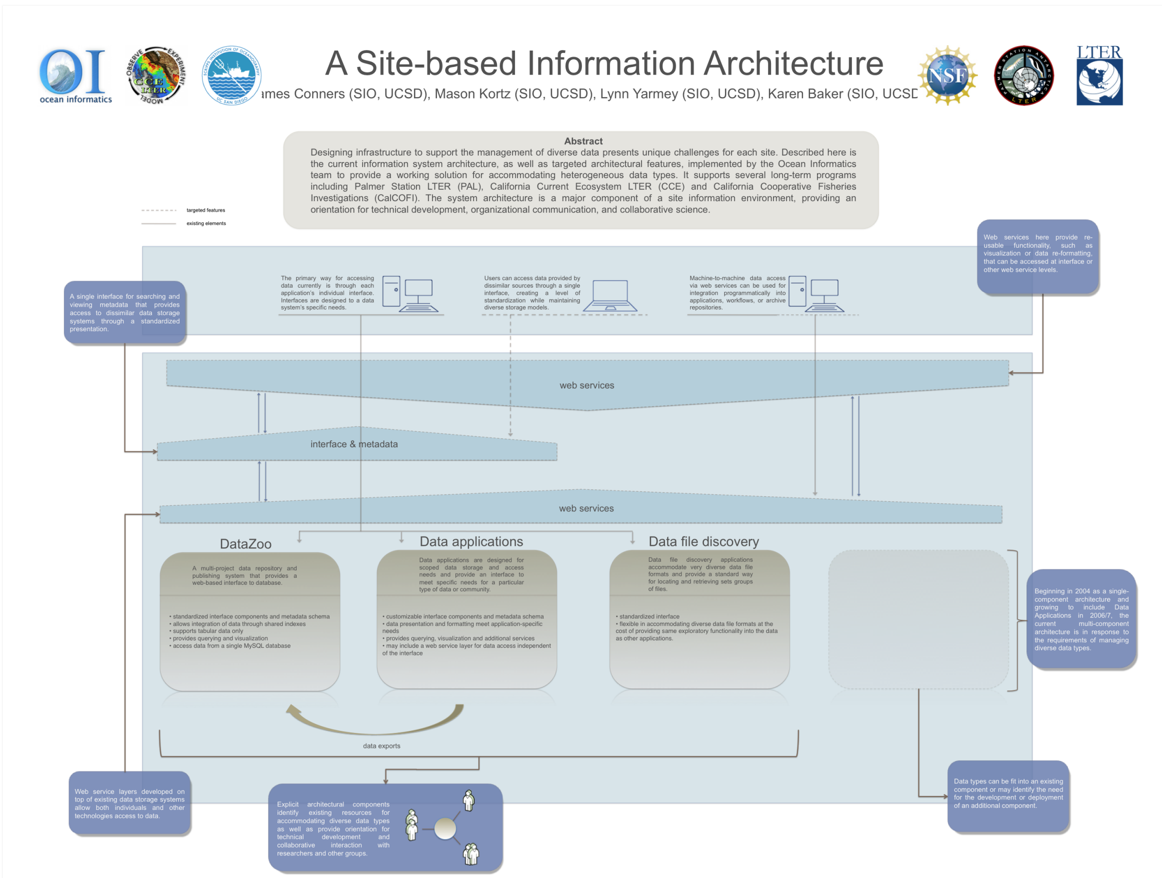

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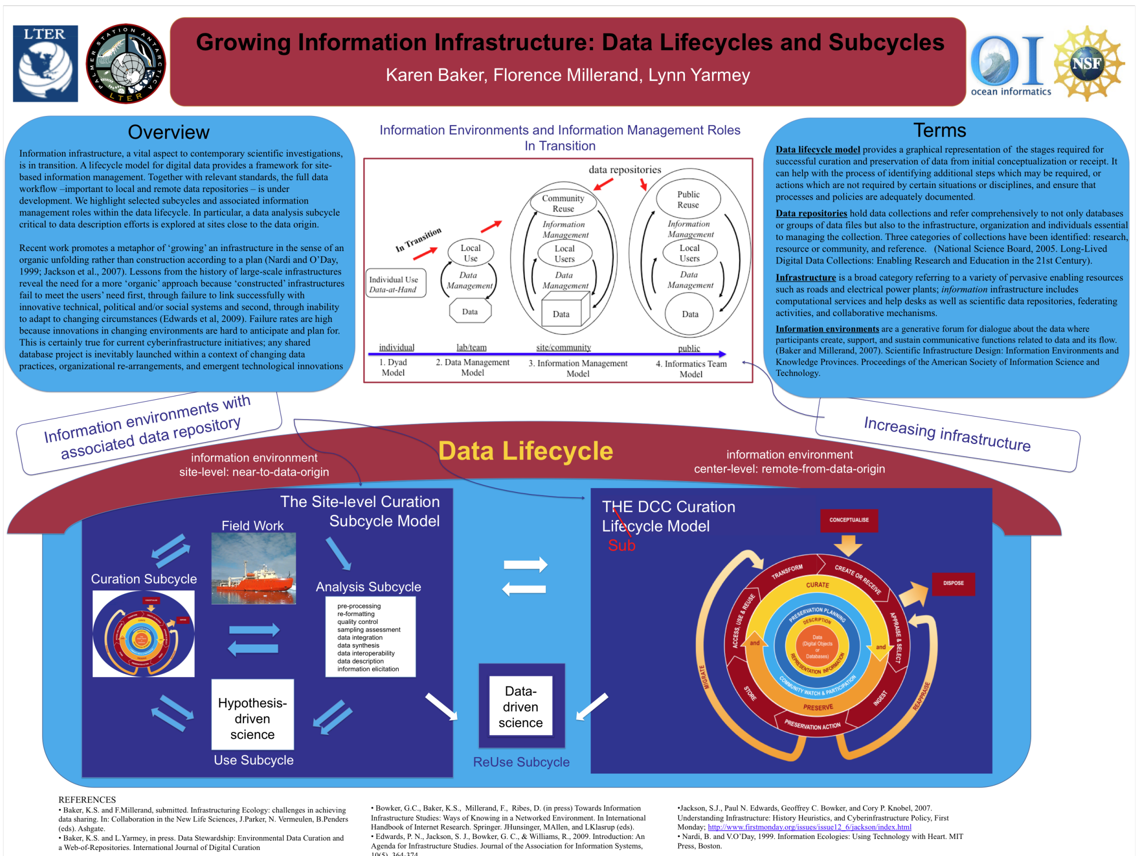
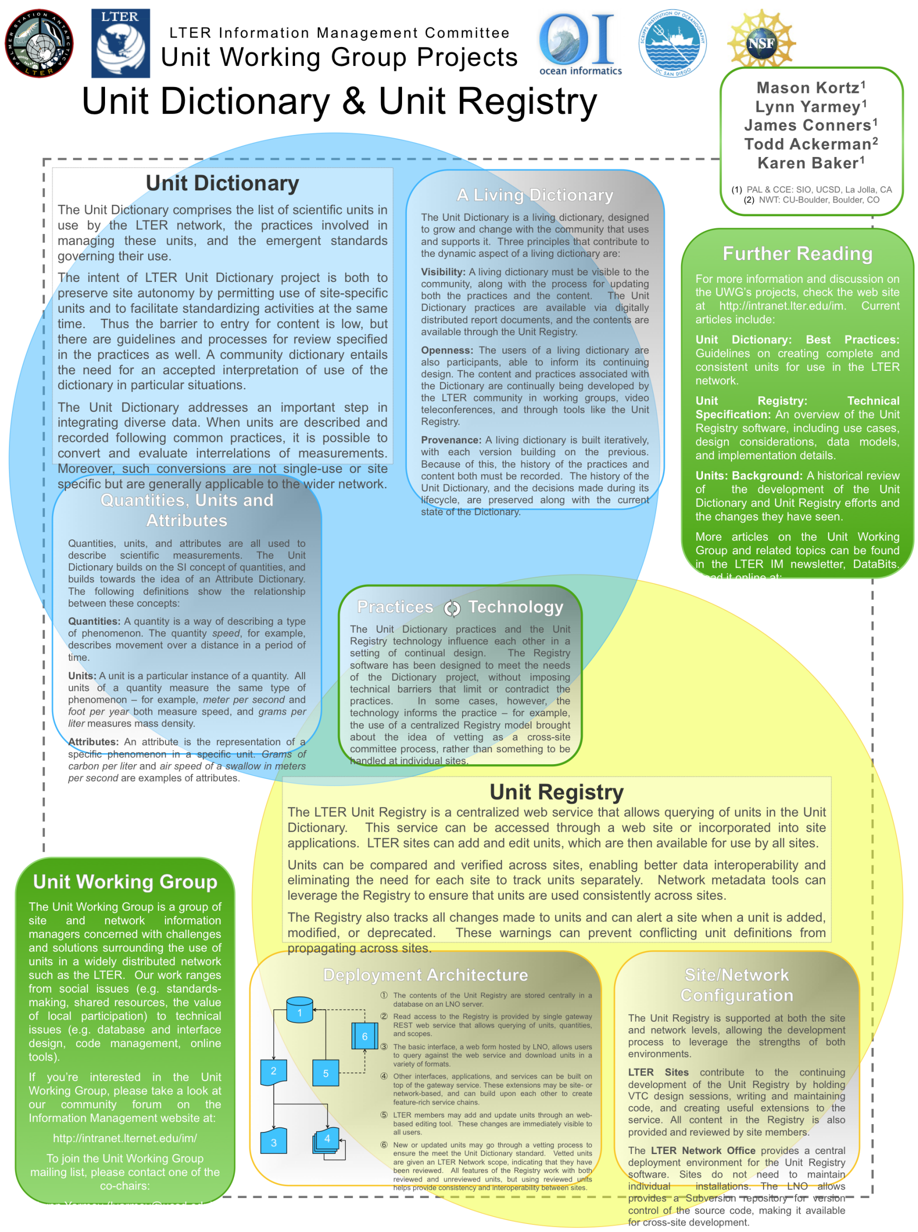
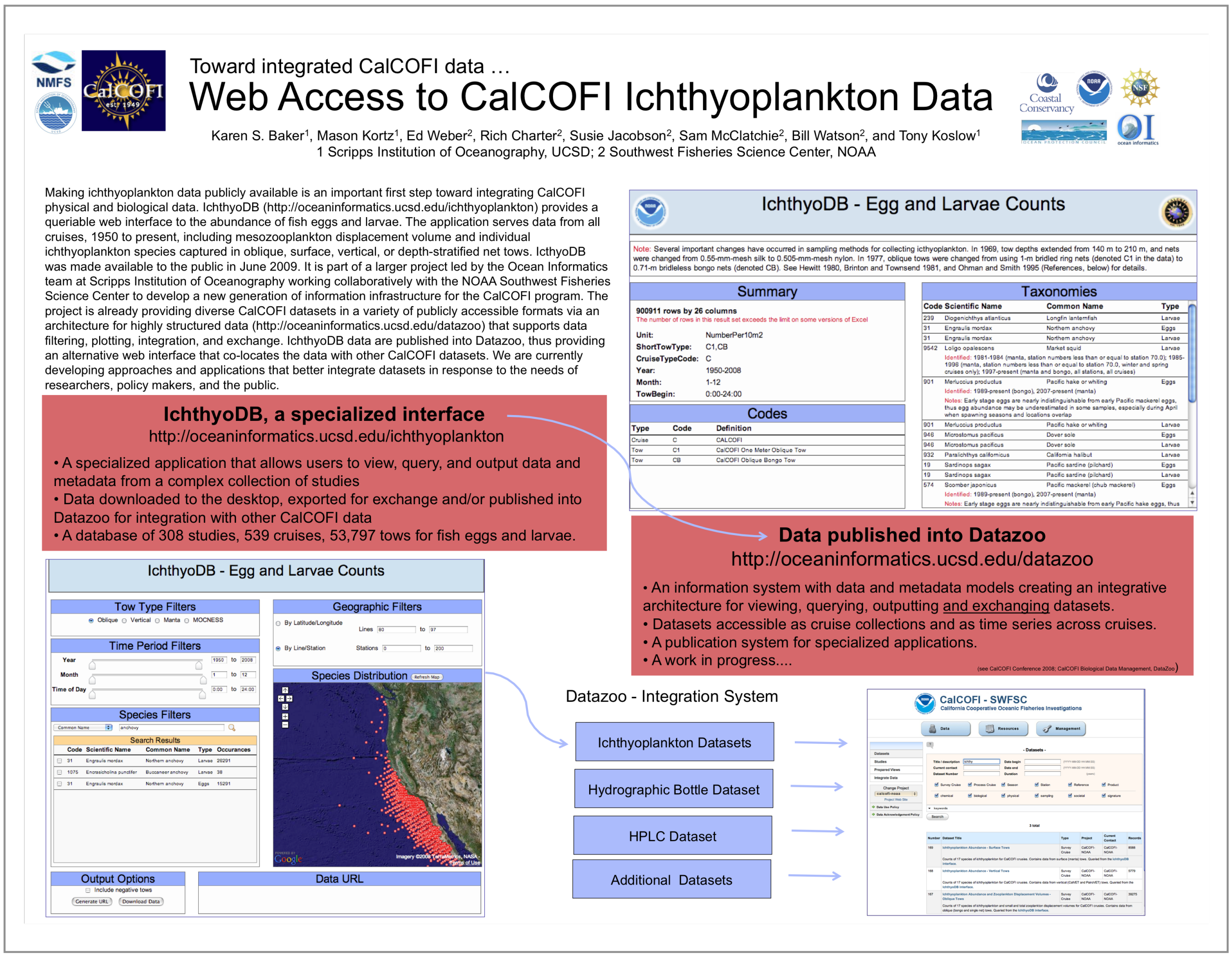
Description: Information infrastructure, a vital aspect to many contemporary scientific investigations, is in transition. A lifecycle model for digital datatogether with plans for standards provide1 a framework for site-based information managemen
Authors: Karen Baker, Florence Millerand, Lynn Yarmey



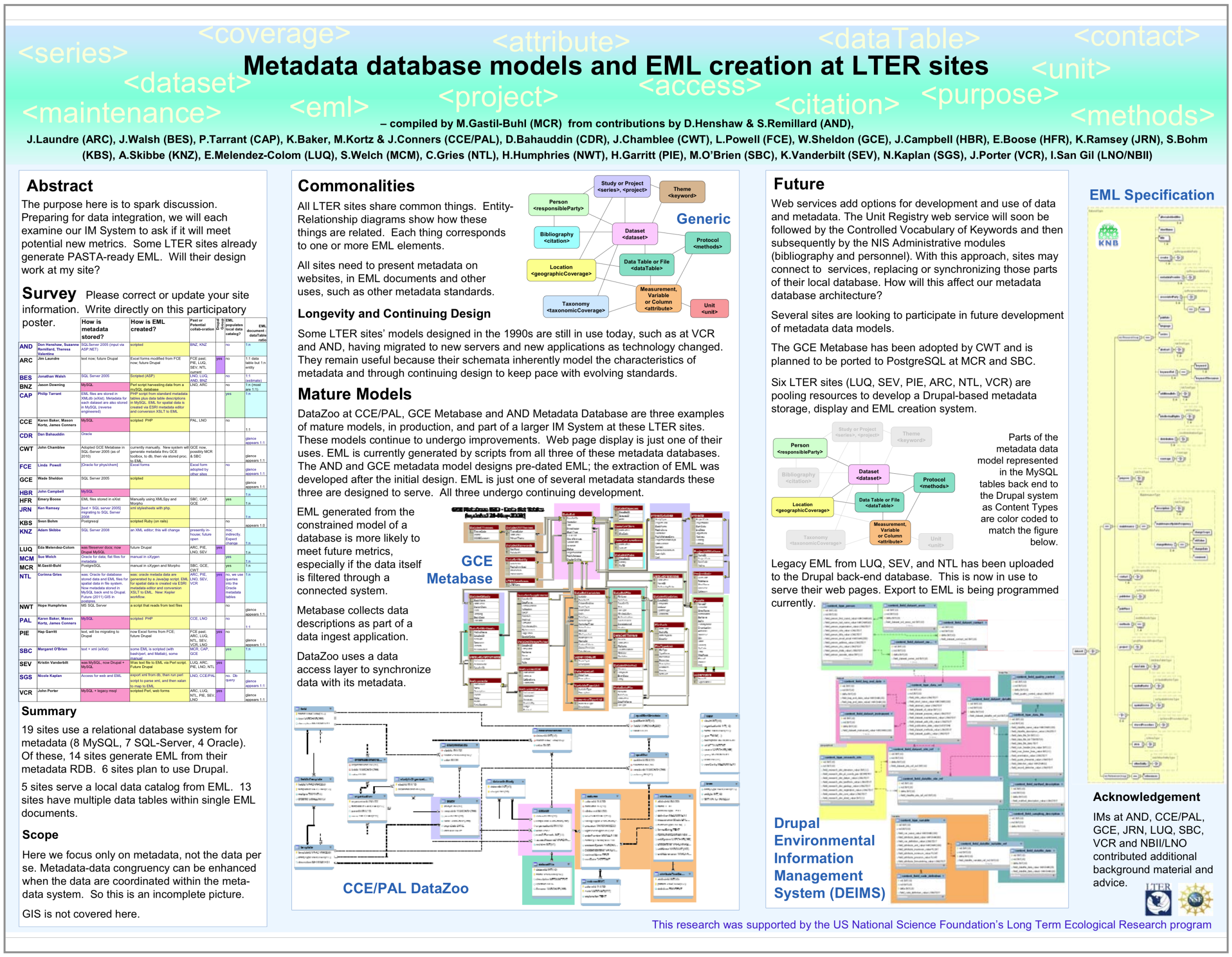
30
Poster date: 2009-09-14
Title: LTER Unit Dictionary & Unit Registry
Description: Units of measurement are a fundamental element of scientific discourse and data integration. The LTER Unit Working Group has developed two initiatives to promote consistent use of units throughout the network including the Unit Dictionary.
Authors: Mason Kortz, Lynn Yarmey, James Conners, Todd Ackerman, Karen Baker



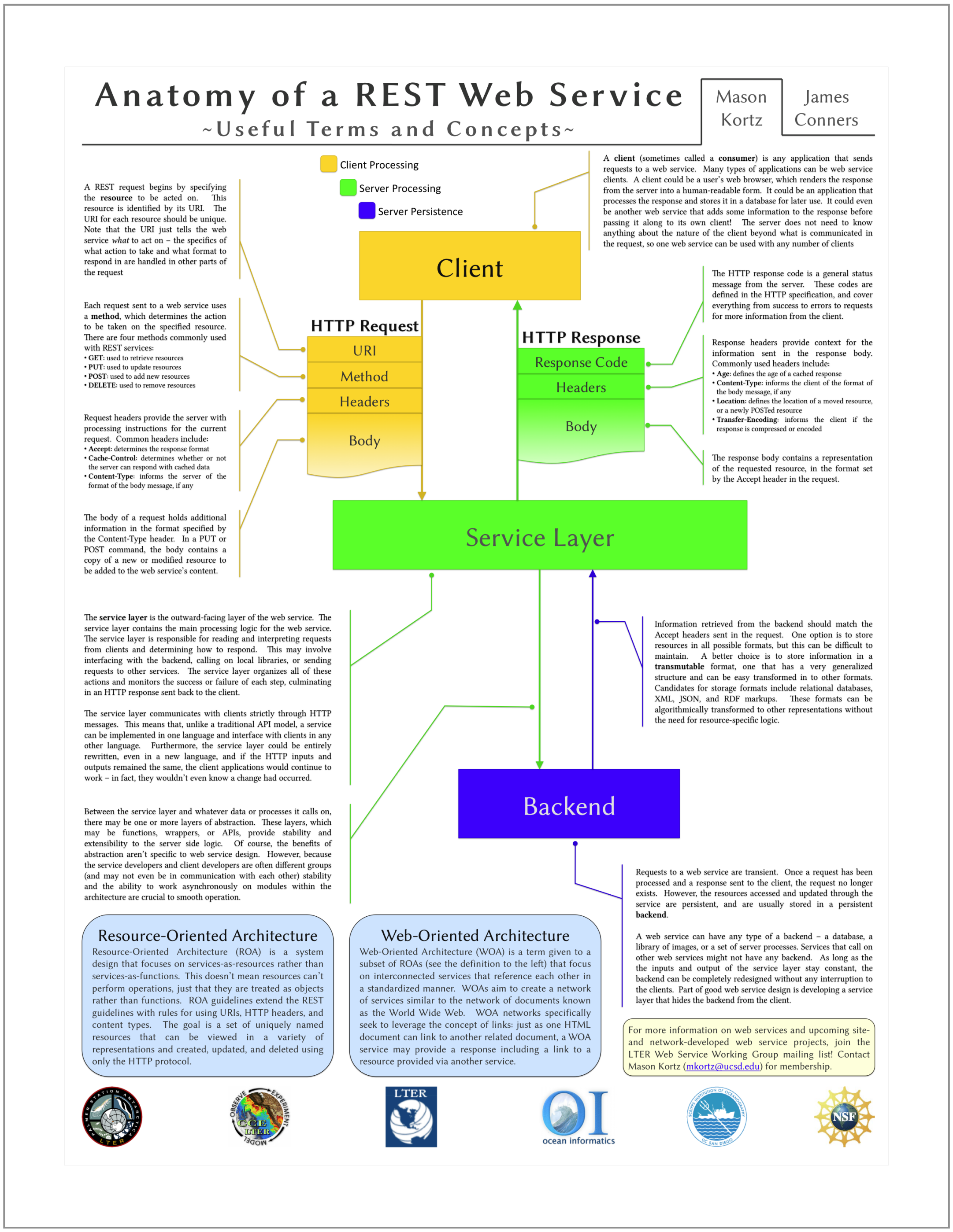
31
Poster date: 2009-12-07
Title: Toward Integrated Data: Web Access to CalCOFI Ichthyoplankton Data
Description: IchthyoDB (http://oceaninformatics.ucsd.edu/ichthyoplankton) is a queriable web application that provides data about abundance of fish eggs and larvae sampled as part of the CalCOFI program.
Authors: Karen Baker, Mason Kortz, Ed Weber, Rich Charter, Susie Jacobson, Sam McClatchie, Bill Watson, Tony Koslow



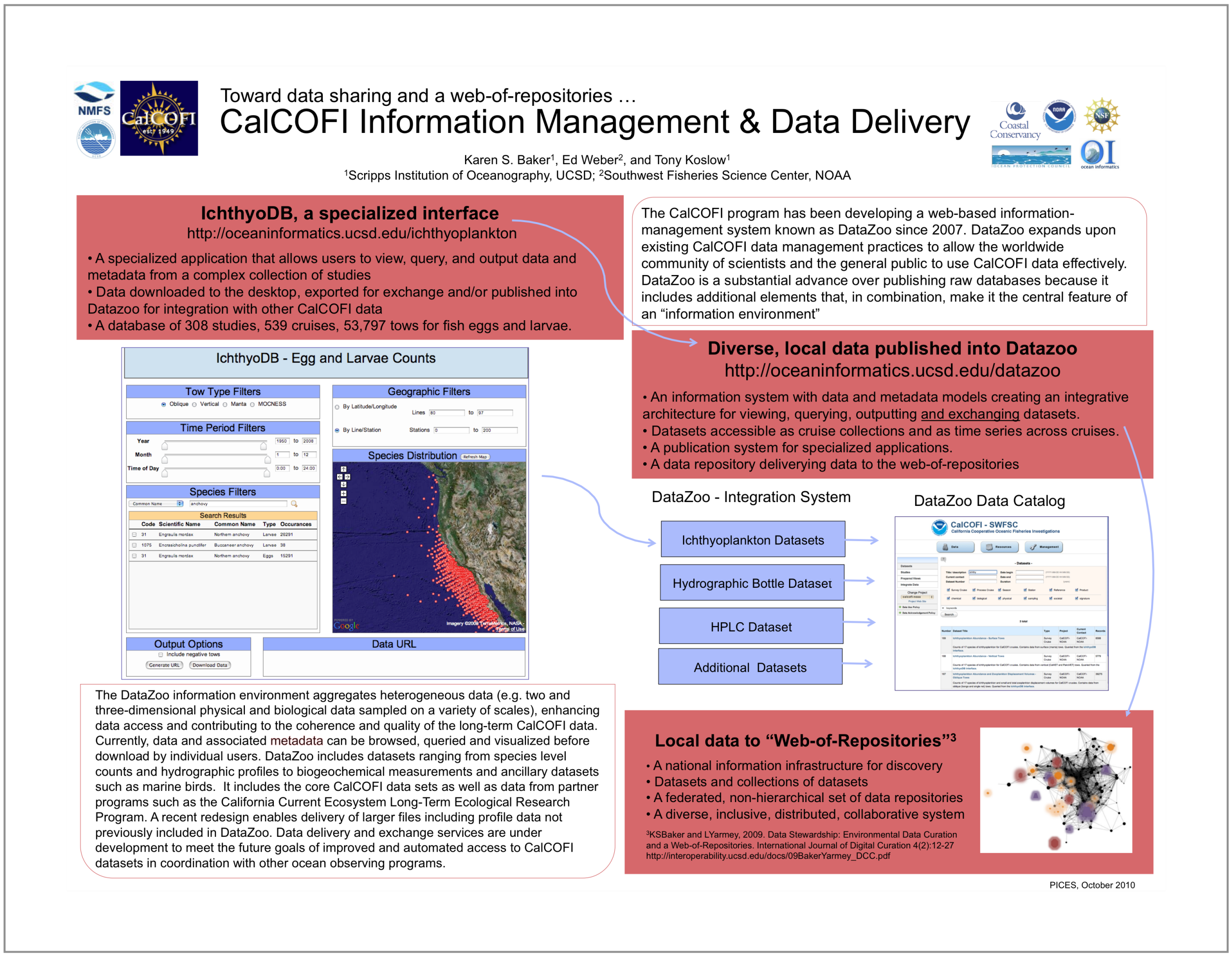
32
Poster date: 2010-10
Title: Metadata Database Models and EML Creation at LTER Sites
Description: Overview of LTER site IM Systems using entity-relationship diagrams.
Authors: M.Gastil-Buhl et al (KBaker, MKortz, JConners)



33
Poster date: 2010-10
Title: Anatomy of a REST Web Service
Description: Presenting a resource-oriented architecture as an augmentation of the web-oriented architecture at the LTER IMC Annual Meeting.
Authors: Mason Kortz, James Conners



34
Poster date: 2010-10
Title: Toward Data Sharing and a Web-of-Repositories: CalCOFI Information Management and Data Delivery
Description: Data flow from specialized interfaces to data published into DataZoo.
CalCOFI program PICES Symposium.
Authors: Karen Baker, Ed Weber, Tony Koslow



35
Poster date: 2010-12
Title: CalCOFI Data Management: Unique Identifiers for Integrating Data
Description: Unique identifiers for co-ordinating and integrating diverse datasets.
Authors: Mason Kortz, Ed Weber, James Conners, Jim Wilkinson,
Karen S. Baker, Tony Koslow

CalCOFI Data Management: Unique Identifiers for Integrating Data

Mason Kortz[1], Ed Weber[2], James Conners[1], Jim Wilkinson[1], Karen S. Baker[1], and Tony Koslow[1]
[1] Scripps Institution of Oceanography, UCSD; [2] Southwest Fisheries Science Center, NOAA

Abstract: The CalCOFI cruise program has been providing a wide array of physical and biological oceanographic data for more than 60 years. Many CalCOFI data analysis projects require that these data be integrated for comparative studies. However, the evolution of sampling and data management practices over six decades often makes accomplishing this integration difficult due to differences in nomenclature such as cruise names, station designations, and methods of grouping related measurements.

In 2009, information managers from SIO and SWFSC began a collaboration to produce a set of unique identifiers to allow physical and biological data to be quickly matched by cruise, station, and sample for both past and future CalCOFI data. The process has been an iterative one. Each iteration has improved the quality and reliability of these matches; from roughly 70% of samples matching in in the first attempt in 2009 to 95% with the latest set of identifiers. During the development of common data indices, the components necessary to resolve data relationships have distilled into three distinct keys. As other data relationships are established, the need for additional components may become apparent. This poster illustrates a set of unique identifiers that support data integration, establishing a standard-fit baseline of merged data for general use and an approach that permits alternative match choices depending on the needs of the individual researcher.

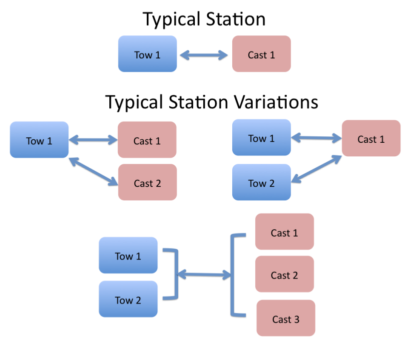
NOAA Data

Net tows (Bongo, Paravet, Manta)

Scripps Data

Physical Data (Bottle samples, CTD casts, etc.)

Data Integration Issues:



Data Integration Solution:

The **StationID** identifies a station occupation within a cruise. A station occupation includes all activity between station arrival and departure. The StationID, which is composed of a line number, station number, and order occupied, provides a way to group related activities. The StationID can be used to reconstruct the timeline of a cruise. It also allows datasets to be quickly and accurately matched at the station level.

The **CruiseID** field is a cruise label that will appear in CalCOFI datasets. The CruiseID includes the departure year, month, and day of the cruise, a cruise type code (in this case 'C' for CalCOFI), and the NODC code for the research ship. The CruiseID label resolves differences in cruise labels across CalCOFI groups and allows for unambiguous matching between datasets.

Within a station occupation, each measurement has a **SampleID**. The SampleID designates data as part of a set of samples taken at a similar time and location. This allows researchers to quickly find comparable data across multiple CalCOFI datasets. The SampleID field consists of a timestamp for the set of samples and a numeric identifier (in case there are multiple, unrelated sampling activities occurring at the same time).

Each set of **data fields** will be associated with a CruiseID, StationID, and SampleID. Currently, CalCOFI data managers are working to assign IDs to sixty years of historical physical and biological data in order to aid in cross-dataset analyses.

In addition to the CruiseID, StationID, and SampleID fields, each dataset will continue to have a full set of **metadata** fields. The new ID fields augment, not replace, the existing metadata. The ID fields provide an easy and reliable way to match data across CalCOFI datasets, but other matching criteria can still be used instead of or in conjunction with the IDs.

CruiseID	StationID	SampleID	Latitude	Longitude	TowDate	...	Engraulis mordax	Sebastes spp.	...
2001-10-25-C-32NM	080.0-060.0-065	045400-1	34.148	-121.153	2001-11-08	...	66.84	0.00	...
2001-10-25-C-32NM	080.0-055.0-066	083400-1	34.295	-120.8	2001-11-08	...	2500.00	140.00	...
2002-01-24-C-31JD	093.3-026.7-001	122600-1	32.958	-117.303	2002-01-24	...	3.79	18.95	...
2002-01-24-C-31JD	093.3-028.0-002	151200-1	32.915	-117.393	2002-01-24	...	0.00	4.91	...

Full Abstracts of Posters by Category

A. POSTERS about Ocean Informatics

10. Title: LTER Growing Information Infrastructure: Data Lifecycles and Subcycles
Author(s): Karen Baker, Florence Millerand, Lynn Yarmey
Date: 2009-09-14
Description: Information infrastructure, a vital aspect to many contemporary scientific investigations, is in transition. A lifecycle model for digital data provides a framework for site-based information management. Together with relevant standards, the full data context, important to local and remote data repositories, is under development. We highlight selected subcycles and associated information management roles within the data lifecycle. In particular, a data analysis subcycle critical to data description efforts is explored at sites close to the data origin.

20. Title: INTEROP Scientific Infrastructure Design: Information Environments and Knowledge Provinces
Author(s): Karen Baker, Florence Millerand
Date: 2007-10-19
Description: Conceptual models and design processes shape the practice of information infrastructure building in the sciences. We consider two distinct perspectives: (i) a cyber view of disintermediation where information technology enables data flow from the field and on to the digital doorstep of the general end-user, and (ii) an intermediated view with bidirectional communications where local participants act as mediators within an information environment. Drawing from the literatures of information systems and science studies, we argue that differences in conceptual models have critical implications for users and their working environments. While the cyber view is receiving a lot of attention in current scientific efforts, highlighting the multiplicity of knowledge provinces with their respective worldviews opens up understandings of sociotechnical design processes and of knowledge work. The concept of a range of knowledge provinces enables description of dynamic configurations with shifting boundaries and supports planning for a diversity of arrangements across the digital landscape.

24. Title: LTER Environmental Data Management: Infrastructure Studies Insights
Author(s): Florence Millerand and Karen Baker
Date: 2007-08-02
Description In the mist of major changes in ecological data collecting, managing and sharing, an interdisciplinary team of information, ecological, and social scientists has been brought together at LTER PAL and CCE sites to facilitate the growth of site-based information infrastructure. While research endeavors traditionally focus either on the technical or on the social aspects of information systems design, this project addresses simultaneously the technical, social, and organizational dimensions of the development, usage, and maintenance of community information infrastructures in ecological science. Issues include design methodology, change mechanisms and interdisciplinary collaboration as well as participant engagement, articulation processes, and data stewardship. The poster presents the project, the research area (Infrastructure Studies), and findings from a case study on the design, development and implementation

processes of the Ecological Metadata Language standard in the LTER community. A conceptual framework based on the notion of enactment from organization theory is presented to broaden the understanding of large-scale information infrastructure deployment. Initiated a decade ago, Infrastructure Studies appears to be a new and promising research area for the digital needs emerging in the natural sciences.

26. Title: LTER: Long Term Informatics
Author(s): Karen Baker, Cyndy Chandler, Anna Gold, Florence Millerand, Jerry Wanetick
Date: 2007-08-02
Description: With the information age as one of the many ramifications of the Internet, our understandings, cultures, and communities are undergoing change. LongTermInformatics.org is a loose network forming in response to contemporary information environment needs and expectations. Participants include local informatics and information infrastructure teams, each adapting to its own environmental data niche. These capacity-building efforts include earth science informatics, library informatics, and social informatics.

28. Title: LTER: Research in Infrastructure Studies: Social & Organizational Perspectives on Ecological Data Management
Author(s): Florence Millerand and Karen Baker
Date: 2006-09-20
Description: In the mist of major changes in ecological data collecting, managing and sharing, an interdisciplinary team of information, ecological, and social scientists has been brought together at LTER PAL and CCE sites to facilitate the growth from site-based to larger-scale federating infrastructures. While research endeavors traditionally focus either on the technical or the social aspects of information systems design, this project addresses simultaneously the technical, social, and organizational dimensions of the development, usage, and maintenance of large-scale information infrastructure in ecological science. Such dimensions include design methodology, change mechanisms and interdisciplinary collaboration as well as participant engagement, articulation processes, and data stewardship. The poster presents the project, the research area (Infrastructure Studies), and findings from a case study on the design, development and implementation processes of the Ecological Metadata Language standard in the LTER community. A conceptual framework based on the notion of enactment from organization theory is presented to broaden the understanding of large scale information infrastructure deployment. Initiated a decade ago, Infrastructure Studies appears to be a new and promising research area for the digital needs emerging in the natural sciences.

33. Title: Initiating the Data Dialogue: 2005 CalCOFI Conference Interactive Poster
Author(s): Karen Baker
Date: 2005-12-06
Description The interactions surrounding the 2005 CalCOFI Data Management poster are captured through photographs of updates and additions made to the poster during the poster session of the annual conference. In addition, the data management workshop held during the conference is shown.

34. Title: CalCOFI Data Management: Overview and Reflection
Author(s): Karen Baker, Karen Stocks

Date: 2005-12-05
Description A CalCOFI White Paper (2005) provides an overview of the current state of data and its management within the California Cooperative Ocean Fisheries Investigations (CalCOFI) program. The report presents steps and recommendations for building towards an integrated, online information system for CalCOFI. In addition to discussing how this effort could scale, the white paper considers present efforts within the context of the emerging Pacific Coast Ocean Observing System (PaCOOS) as well as other community efforts. As one of the longest-running, multidisciplinary ocean monitoring and observing programs in existence, the emphasis of data management within CalCOFI has focused on the twin goals of (a) quality control and curation of individual datasets collected on CalCOFI cruises and (b) data availability for researchers and fisheries managers through printed reports and requests to the data curators. Today, a new goal is emerging of having CalCOFI datasets available online and, eventually, interoperable with other CalCOFI-related datasets and within the larger, developing federation of the Ocean Observing System data. In this poster we provide a summary of concrete recommendations for moving forward in addition to inviting participants to consider their datasets in the context of a collection of CalCOFI datasets.

B. POSTERS by Ocean Informatics: Conceptual

6. Title: LTER: A Web of Repositories
Author(s): Lynn Yarmey, Karen Baker
Date: 2009-09-14
Description: The movement and exchange of data are frequently described using a 'flow' or a 'pipeline' model. We differentiate a uni-directional data 'flow' from an alternative model, a web-of-repositories. A web-of-repositories is a federation of diverse nodes where communication, connections, and data exchange are multi-directional. Each node has a unique sphere-of-context with technical, organizational and social dimensions. In this poster we explore a multi-repository data landscape.

7. Title: LTER Information Management History Database (HistoryDB)
Author(s): Robert Petersen, Sean Wiley, Nicole Kaplan, Eda Melendez, Karen Baker
Date: 2009-09-14
Description: Organizational history requires a facility to manage, archive and present event details as well as narratives that provide perspective to the events. While events form a historical thread, storied narratives weave these threads together into a retrospective. The LTER Information Management Committee has recognized that working collaboratively to understand their history is a tool for exploring how they function within the LTER organizational structure. Such a tool provides valuable input to the development of governance procedures for community-level efforts. The Information Management Committee Governance Working Group is designing and developing HistoryDB as a platform to record and publish significant events related to the development of Information Management within the LTER network. This work is prompted by the recognition of how our future may well be informed if we are able to remember and discuss our past.

14. Title: LTER Information Managers: A Community of Practice

Author(s): Karen Baker, Nicole Kaplan, Inigo San Gil, Margaret O'Brien, Florence Millerand
Date: 2008-08-10
Description: Communities of Practice are groups of people who share a concern or a passion for something they do and who want to learn more about how they do it. Such a community is more than a group of people having the same job or a network of connections between people. Three elements characterize a Community of Practice: 1) the domain, 2) the community, and 3) the practice. Regular interaction such as with an annual meeting is a key integrative mechanism that brings into play elements of practice including agenda setting, knowledge management, professional development, advocacy, and resource mobilization. The history and multi-dimensional aspects of Communities of Practice provide a framework for considering information management organizationally through structures that facilitate communication and learning. We explore the Long Term Ecological Research Information Management Committee in particular as a Community of Practice. Examples of how the information management role has emerged and is defined within the Long Term Ecological Research community will be presented. How the committee as a collective fits within this framework will be considered by taking into account interests, activities, and relations. Active membership, professional engagement, and collective learning are needed to ensure relevance as well as long-term sustainability.

15. Title: LTER Information Infrastructure: Emergent Roles, Responsibilities and Practices
Author(s): Lynn Yarmey, Karen Baker
Date: 2008-08-10
Description: Human activities together with technical elements and collective practices are core elements for growing local infrastructure as well as for bridging with other communities and networks. Site information management activities create a shared data curation experience where data curation refers to managing the capture, use and preservation of the data. Identifying and elaborating upon local data activities opens up the complex set of arrangements that comprise site information management, including the variety of roles emerging to address mediation and collaboration. Any one activity may be carried out in practice by different participants at each site. That is, what one site considers an information management role may be carried out by a researcher, technician, analyst, or education coordinator at another site. The diverse distributions of responsibilities at each site are a result of meeting local scientific needs with a mix of local participants and practices. Comparing and contrasting different site infrastructure arrangements prompts discussion that deepens our understanding of data and data curation. Insight into data activities and their associated roles and responsibilities may be seen as a preparatory step for conscientiously designing an effective data network.

31. Title: LTER IM Articulation Work: Developing Community Web Recommendatiaons
Author(s): Nicole Kaplan, Karen Baker, Barbara Benson, John Campbell, Corinna Gries, James Laudre, Jeanine McGann, Eda Melendez-Colom, Marshall White
Date: 2006-09-20
Description: Over the past two years, the Web Site Design Recommendations Working Group developed recommendations for web sites in response to challenges of first generation LTER web sites. They worked to align a set of social, technical and organizational elements. Articulation work is described as work that enables other work such as within a task, within a project, or across organizational entities. Articulation work refers to the interrelating of parts or

the alignment of work elements, often involving a range of planning, coordinating, and negotiating efforts. The Web Site Design Recommendations working group's efforts are an example of articulation work involving both explicit elaboration and attention to alignment of multiple elements. Social and organizational elements were considered while addressing the needs of web site users, organizational and technical elements influenced recognizing successful navigational and organizational components, and community and technical elements were used to create designs and links to communicate each site as being part of the LTER Network. The recommendations are currently being presented to the LTER Executive Board. This working group's work will need to continue - key is the need for review and update in order to accommodate changes in technology and delivery mechanisms as well as in conceptual understandings, organizational categories, social perspectives, community elements, and synthesis strategies. Future plans thus include planning both for updated web design and for the attendant articulation work.

25. Title: LTER: Data Integration in the Decade of Synthesis
Author(s): Mason Kortz, Lynn Yarmey, James Conners, Karen Baker
Date: 2007-08-02
Description As data availability, findability, and even queriability become more ubiquitous, the need to make sense of data from multiple, disparate sources increases. Data integration and data synthesis allow extension of the scope of data beyond local use, creating a whole that is greater than the sum of its parts. This poster/demo examines the similarities and differences between integration and synthesis, taking PAL and CCE site-level data integration projects and their role in the LTER network data synthesis efforts as case examples. The poster also describes the possibility of recursive integration and synthesis and discusses the role of metadata in data integration.

C. POSTERS by Ocean Informatics: Technical

1. Title: CalCOFI Data Management: Unique Identifiers for Integrating Data
Author(s): Mason Kortz, Ed Weber, James Conners, Jim Wilkinson, Karen S. Baker, and Tony Koslow
Date: 2010-12-03
Description: The CalCOFI cruise program has been providing a wide array of physical and biological oceanographic data for more than 60 years. Many CalCOFI data analysis projects require that these data be integrated for comparative studies. However, the evolution of sampling and data management practices over six decades often makes accomplishing this integration difficult due to differences in nomenclature such as cruise names, station designations, and methods of grouping related measurements.

2. Title: CalCOFI Information Management and Data Delivery
Author(s): Karen Baker, Ed Weber and Tony Koslow
Date: 2010-10-22
Description: The CalCOFI program has been co-developing a web-based information-management system known as DataZoo since 2007. DataZoo expands upon existing CalCOFI data management practices to allow the worldwide community of scientists and the general public to use CalCOFI data effectively. DataZoo is a substantial advance over publishing raw databases because it includes additional

elements that, in combination, make it the central feature of an ?information environment?. The DataZoo information environment aggregates heterogeneous data (e.g. two and three-dimensional physical and biological data sampled on a variety of scales), enhancing data access and contributing to the coherence and quality of the long-term CalCOFI data. Currently, data and associated metadata can be browsed, queried and visualized before download by individual users. DataZoo includes datasets ranging from species level counts and hydrographic profiles to biogeochemical measurements and ancillary datasets such as marine birds. It includes the core CalCOFI data sets as well as data from partner programs such as the California Current Ecosystem Long-Term Ecological Research Program. A recent redesign enables delivery of larger files including profile data not previously included in DataZoo. Data delivery and exchange services are under development to meet the future goals of improved access to CalCOFI datasets in coordination with other ocean observing programs.

3. Title: Metadata database models and EML creation at LTER sites
Author(s): M.Gastil-Buhl (MCR) from contributions by D.Henshaw & S.Remillard (AND), J.Laundre (ARC), J.Walsh (BES), P.Tarrant (CAP), K.Baker, M.Kortz & J.Conners (CCE/PAL), D.Bahauddin (CDR), J.Chamblee (CWT), L.Powell (FCE), W.Sheldon (GCE)
Date: 2010-09-23
Description: The purpose here is to spark discussion. Preparing for data integration, we will each examine our IM System to ask if it will meet potential new metrics. Some LTER sites already PASTA-ready EML. Will their design work at my site?

4. Title: Anatomy of a REST Service: Useful Terms and Concepts
Author(s): Mason Kortz, James Conners
Date: 2010-09-23
Description: An overview of the basic concepts and technology of a REST web service.

5. Title: CalCOFI Toward Integrated Data: Web Access to CalCOFI Ichthyoplankton Data
Author(s): Karen Baker, Mason Kortz, Ed Weber, Rich Charter, Susie Jacobson, Sam McClatchie, Bill Watson, Tony Koslow
Date: 2009-12-07
Description: IchthyoDB (http://oceaninformatics.ucsd.edu/ichthyoplankton) is a queriable web application that provides data about abundance of fish eggs and larvae sampled as part of the CalCOFI program. The application serves data from all cruises, 1950 to present, including mesozooplankton displacement volume and individual ichthyoplankton species captured in oblique, surface, vertical, or depth-stratified net tows. IcthyoDB was made available to the public in June 2009. It is part of a larger project led by the Ocean Informatics team at Scripps Institution of Oceanography working collaboratively with the NOAA Southwest Fisheries Science Center to develop a new generation of information infrastructure in support of the CalCOFI program. The project is already providing diverse CalCOFI datasets in a variety of publicly accessible formats through Datazoo, an information system for highly structured data that supports data filtering, plotting, integration, and exchange (http://oceaninformatics.ucsd.edu/datazoo). IchthyoDB data are published into Datazoo, thus providing an alternative web interface that co-locates the data with other CalCOFI datasets. We are currently developing approaches and applications that better integrate datasets in response to the needs of researchers, policy makers, and the public.

8. Title: PAL & CCE LTER: A Site-Based Information Architecture
Author(s): James Conners, Mason Kortz, Lynn Yarmey, Karen Baker
Date: 2009-09-14

Description: Designing infrastructure to support the management of diverse data presents unique challenges for each site. Described here is the current information system architecture, as well as targeted architectural features, implemented by the Ocean Informatics team to provide a working solution for accommodating heterogeneous data types. The system architecture is a major component of a site information environment, providing an orientation for technical development, organizational communication, and collaborative science.

9. Title: LTER Unit Working Group Projects: Dictionary and Registry
Author(s): Mason Kortz, Lynn Yarmey, James Conners, Todd Ackerman, Karen Baker
Date: 2009-09-14
Description: Units of measurement are a fundamental element of scientific discourse and data integration. The LTER Unit Working Group has developed two initiatives to promote consistent use of units throughout the network. One is the LTER Unit Dictionary, comprising the set of units in use by the LTER sites and the best practices that support them. The other is the Unit Registry, a software solution for online access to the Unit Dictionary. This poster provides an overview of both efforts, including motivations, progress made, and future plans.

11. Title: CCE LTER: An Oceanographic Eventlogger as One Part of an Information Environment
Author(s): Karen Baker, Mason Kortz, James Conners
Date: 2009-05-13
Description: The CCE LTER initiated at SIO in 2004 enabled launch of "Ocean Informatics", a new approach to design of information infrastructure in support of interdisciplinary science. CCE works synergistically with Palmer Station LTER and with California Cooperative Oceanic Fisheries Investigations (CalCOFI) at Scripps and at NOAA Southwest Fisheries Science Center. Major activities of the CCE LTER Information Management to date have been to develop an information environment that includes: a) a cross-project, open source framework that provides collaborative tools and activities; b) a project web site (http://cce.lternet.edu) with dynamic elements such as personnel and bibliography modules; c) an information system (http://oceaninformatics.ucsd.edu/datazoo) serving as a local data repository providing both data access and integration; d) a multi-component architecture anchored by data dictionaries and metadata; and e) a suite of resources supporting local data handling, analysis, and visualization. Local informatics research focuses on discursive practices, sociotechnical systems design, and the semantic work required at the human-information interface while network activities include participation in a dictionary working group,governance working group, and the Databits Newsletter. The event logger used at sea as part of the data flow process is being demo'd during the LTER Science Council Pier Walk at Scripps Institution of Oceanography.

12. Title: CalCOFI Biological Data Management
Author(s): Karen Baker, Mason Kortz, James Conners, Lynn Yarmey
Date: 2008-11-17
Description: An information system designed for working with multiple oceanographic biological data collections is presented. DataZoo is an extensible system that supports data discovery, access, query, and exchange for data such as the CalCOFI integrated biological data and bottle measurements from hydrographic casts. The poster will provide answers to: What is DataZoo?; What does it do?; Who uses it?; What's in it?; How is it built? The system is a data and metadata repository designed to meet the needs of researchers, policy makers and the public. It is a publishing forum that includes a dataset catalog, personnel directory, and metadata system. Dictionaries and controlled vocabularies play a key role and facilitate data integration. The metadata schema takes into account local and community standards including the Ecological Metadata Language, augmenting it with local unit, attribute, and qualifier

dictionaries. DataZoo is organized into three web-based functional units: data, resources, and management. A suite of resources extend the information system interface to the desktop so local participants can manage their own data - and in turn consider their individual data practices in relation to a project repository made readily apparent via web interfaces and web services. A community information system creates a data curation commons that highlights shared technical components, organizational arrangements, and collective practices, all central elements to growth of a local information infrastructure able to bridge projects, communities and networks.

13. Title: LTER Abstracting Functionality and Access: Facilitating Data System Manageability and Site Coordination

Author(s): Mason Kortz, James Conners, Karen Baker

Date: 2008-08-10

Description: As the functionality of site data systems increases, frequently so does the complexity. Organizing system functionality through distinct layers of abstraction, from low-level system access to high-level user access, is key to maintaining a manageable system. Toward this end, a data system that is an interdependent set of databases, files, and other resources can often be abstracted into a relatively compact set of data access methods. Abstraction layers allow developers to leverage not only the content of a data system but the organizational logic as well. Leveraging may take the form of facilitating local site reuse or sharing across projects and sites. Abstraction enables the development of multiple applications, accessing the same data system - and its data - via a single interface layer. This poster explores three models by which data access methods may be abstracted and shared: application programming interfaces, remote procedure calls, and resource state transfers. Each model is defined in general as well as illustrated by examples designed, developed, and deployed at two Long-Term Ecological Research sites (Palmer Station and California Current Ecosystem).

16. Title: Scientific Communication and Information Infrastructure

Author(s): Karen Baker, Beth Simmons, Ryan Rykaczewski, Alison Cawood, Peter Davison, Moira Decima, Melissa Garren, Andrew King, Andrew Taylor, Jesse Powell, Melissa Soldevilla, Mike Stukel

Date: 2008-08-10

Description: Scientific communication is central to collaborative scientific endeavors. A shared information infrastructure facilitates communication and collaboration. Digital information infrastructure occurs in multiple forms. The poster presents examples of CCE LTER communication: data publishing with information system DataZoo, story publishing with a children's book, community designing with a design studio, multi-media publishing with a picture gallery, referencing with an online bibliography, real-time field experiences with a picture-of-the day, local field experience with pier walks, data stewardship & sampling design with an event logger, and a community website with the CCE Home Page.

17. Title: CalCOFI Local Metadata: Augmenting the Ecological Metadata Language

Author(s): Lynn Yarmey, Karen Baker, James Conners

Date: 2007-11-17

Description: Metadata is an integral and necessary part of data sharing; the enactment of a metadata standard not only guides the creation of local metadata documents but is also a link between local and broader communities. A full metadata record, including but not limited to descriptions of the field environment, detailed accounts of analytical methods, and summaries of quality control procedures, is essential to the understanding and use of any dataset. Without the context of the data, measurement values are subject to misinterpretation and misuse. A rich local metadata standard prompts consideration of the range of information necessary to form a complete metadata record. Such a standard creates a structure and format that provide those knowledgeable about a dataset a place to record unique as well as common elements. Standardized metadata functionally makes possible automated comparisons and visual presentation of datasets. In addition to establishing a local foundation for data sharing, a standard becomes an integrative bridge when developed in parallel with community and national standards. The Ecological Metadata Language (EML) provides a metadata specification with growing acceptance in environmental science communities. In this poster, we discuss adaptations and augmentations made to EML for the Ocean Informatics community information system (DataZoo) in order to ensure the local metadata structure, while still linked to the broader community, is optimized to capture any complexity associated with local oceanographic datasets.

18. Title: CalCOFI Data Management: Developing Community Standards

Author(s): James Wilinson, Karen Baker, Rich Charter

Date: 2007-11-17

Description: CalCOFI represents a partnership of multiple agencies conducting quarterly joint oceanographic cruises, CalCOFI field team members work as a cohesive cross-agency unit to accomplish the cruise goals. Associated participants frequently integrate their field measurements and sampling with the long-term core CalCOFI measurements and samples. Once a cruise concludes, however, this cohesive unit disperses; individuals return to their respective agencies and labs to process samples and analyze data. Each group uses lab or agency specific methods and software to generate data products in local formats. These diverse data processing methods, products, and storage formats create challenges for merging datasets. Development and incorporation of shared data management practices or joint standards enable data integration. Shared practices include a) Standard, persistent vocabulary and formats e.g. use of the same labels for the same data columns with translation tables for different units; b) Standard, persistent date & position formats; c) Standard line & station designations for gridded data e.g. 93.3 120.0; d) Sequential station numbering e.g. order-occupied; e) Event numbers e.g. when needed for resolving station activities; f) Distribution of data in non-proprietary format e.g. tab delimited text or csv Metadata i.e. details of context, measurements & equipment; g) Designating common columns, such as order occupied or event number, and adding them to existing data products allows heterogeneous datasets to be related and ingested into relational databases or into data analysis and visualization applications.

19. Title: CalCOFI & Ocean Informatics DataZoo: A Multi-Project Data Publishing System

Author(s): Mason Kortz, James Conners, Karen Baker

Date: 2007-11-17

Description: The DataZoo information system is a hub in the Ocean Informatics learning environment that creates a central forum for data exchange, collaborative design, and community building. It is a central repository for data and metadata of member projects, providing data aggregation, ingestion, description, visualization, download, integration, and standardized exchange. It serves as a publishing arena for datasets from individual project members and from project groups. A number of design features facilitate scientific work. For example, local work benefits from data availability and queriability while community work benefits from alignment with metadata standards. The flow of data from the field to a local repository is supported through cross-project extensibility, dataset ingestion templates, and time-series storage of study collections. Data integration and exchange are enabled by the use of study-specific internal indexing, cross-project dictionaries, and augmented metadata describing data to a column level. Ancillary related tools are being developed such as project-specific sampling grid converters, dataset joining tools, and a date-time calculator. Working together with LTER and CalCOFI participants to develop a local information system creates the opportunity to improve capture of data and metadata as well as to understand community needs.

21. Title: CCE LTER Information Infrastructure

Author(s): Jerry Wanetick, Karen Baker, Nate Huffnagle, Lynn Yarmey, Mason Kortz, James Conners
Date: 2007-09-17
Description: Information Infrastructure is an arrangement of computational systems, an iTeam, information systems and partnerships associated with a core interest in informatics. Ocean Informatics is defined as the work at the intersection of oceanography, social science and information science.

22. Title: Ocean Informatics Information System: One Element of an Information Infrastructure
Author(s): Karen Baker, Mason Kortz, James Conners, Jerry Wanetick
Date: 2007-09-17
Description: Focus is on an Information system for managing data - DataZoo 2.0 -at the heart of a configuration of computational systems, an iTeam, informatics work, and a complex set of partnerships.

23. Title: A working Standard: Augmenting the Ecological Metadata Language
Author(s): Lynn Yarmey, Karen Baker
Date: 2007-09-17
Description: Metadata standards are an integral and necessary part of data sharing as they provide a structure and format to allow comparisons of data context. A full and complete metadata record is essential to understanding and using any dataset, as without the context of the data, values are meaningless. A metadata standard not only prepares for future dataset comparisons and integrations, but also prompts the user to consider of all parts of a complete metadata record, from descriptions of the field environment to detailed accounts of any and all analytical methods and quality control procedures preformed. A standardized metadata format also allows for quick automated or visual comparisons of datasets and begins to lessen the impact from any workflow articulation differences. The Ecological Metadata Language (EML) is a standard with growing acceptance in the scientific realm, it's strengths include attribute-level descriptions and a flexible architecture. In this poster, we discuss the adaptations and augmentations made to EML to better encapsulate the complexity inherent to our local datasets.

25. Title: LTER: Data Integration in the Decade of Synthesis
Author(s): Mason Kortz, Lynn Yarmey, James Conners, Karen Baker
Date: 2007-08-02
Description: As data availability, findability, and even queriability become more ubiquitous, the need to make sense of data from multiple, disparate sources increases. Data integration and data synthesis allow extension of the scope of data beyond local use, creating a whole that is greater than the sum of its parts. This poster/demo examines the similarities and differences between integration and synthesis, taking PAL and CCE site-level data integration projects and their role in the LTER network data synthesis efforts as case examples. The poster also describes the possibility of recursive integration and synthesis and discusses the role of metadata in data integration.

27. Title: CalCOFI: An Oceanographic Event Logger
Author(s): James Wilkinson, Karen Baker
Date: 2006-12-04
.Description: Local data management, informed by field sampling and data use, supports community coordination at the interface of data collection and data curation. An oceanographic event logger recently deployed on a series of research cruises extends data management into the data collection arena. The event logger system consisting of a digital tablet, a community eventlog, and a unique index - is designed to promote conventions such as standard vocabulary and to establish relations between diverse data

efforts at the time of collection. The event logger addresses issues of time, space and categorization that assist subsequent data integration.

29. Title: CCE LTER: Information Management (2004-2006)
Author(s): Karen Baker, Lynn Yarmey, Mason Kortz, Jerome Wanetick
Date: 2006-09-20
Description: The California Current Ecosystem information management efforts were launched with inquiries into existing data practices. This was followed by design, development and deployment of elements of an information infrastructure including secure web and file services as well as a platform for exploration of collaborative software applications from content management systems to shared plotting tools. A set of core technical services have been developed including extensive file storage capacity, disk sharing technologies, and planning toward single sign-on directory services. Sociotechnical services have included development of an Ocean Informatics conceptual framework supporting infrastructure process-building, design teams, and forums within the Integrative Oceanography Division at Scripps Institution of Oceanography. Two initial information system elements include database development organized in coordination with field use of an electronic event logger and a web site designed to include dynamic elements such as a bibliography module, media gallery, regional mapping application, and station location converter. Work on both metadata and quality assurance proceeds synergistically with local organizational partners Palmer LTER guided by the LTER community standards, the California Cooperative Oceanic Fisheries Investigations (CalCOFI) with an emerging regional program Pacific Coast Ocean Observing System (PACOOS), the Southern California Ocean Observing System (SCCOOS) and support communities such as Quality Assurance of Real-Time Oceanographic Data (QARTOD) and the Marine Metadata Interoperability Project (MMI).

30. Title: Palmer LTER: Design of a Queriable Ocean Information System
Author(s): Karen Baker and Shaun Haber
Date: 2006-09-20
Description: Field data, originating with domain understandings and practices that shape sampling and collection, has informed development of the PAL LTER information system. In becoming digitally preserved, data capture may in turn be influenced by an information system's organizing principles and structure. Focusing on the goal of an automated web service able to browse datasets in hierarchical arrangements, to generate automated queries and plots, and to meet community metadata and exchange standards, design has involved both exploring potential system assumptions and constraints as well as on articulating their ramifications in terms of requirements for data to adapt to such a system. In moving from a data system that makes data accessible to an information system that makes data queriable, the PAL LTER data structure makes use of templates for dataset type definitions, of attribute dictionaries referenced to unit dictionaries, and of quality assurance procedures as central to the capacity for automating traversals through the system. In terms of developing understandings of data and its availability in digital repositories, information system design (and redesign) may be considered an important part of data stewardship.

32. Title: Ocean Informatics: Conceptual Framework for Marine Science Information Management
Author(s): Karen Baker, Jerry Wanetick, Shaun Haber, Lynn Yarmey, Mason Kortz, Florence Millerand, Jesse Powell, Jim Wilkinson, Robert Thombley, Julie Thomas, Beth Simmons
Date: 2006-04-01
Description: The work of Ocean Informatics is represented at the union of oceanography, information science and social science domains. Participants range from data and information managers to technical

specialists, archivists, scientific researchers, educators, as well as those working in science and infrastructure studies.

35. Title: Palmer LTER: Information Flow and Management

Author(s): Karen Baker, Anna Gold, Frank Sudholt, Helena Karasti, Geoffrey Bowker
Date: 2003-09-18
Description: Organizational repositories are being constructed today to address the needs of scientific information management in a digital environment. Given the social aspects of information, building useful information systems requires infrastructures that reflect the unified and expressive relationships of data, documents, people, institutions and partnerships. The Palmer Long-Term Ecological Research (LTER) program information management is working in partnership to explore articulation of the LTER community information management practices and to prototype a co-construction of a low barrier bibliographic referatory/repository.

11 Appendix: Ocean Informatics Event Gallery

A table summarizing events is given below followed by event flyers created as a one-page reminder of visitors and events occurring during the visit.

Date	Title	Description
2003-12-10	US Joint Global Ocean Flux Study and Data Systems	JGOFS Visit: Cyndy Chandler
2004-10-18	PACOOS-CalCOFI Data Management Meeting	PACOOS-CalCOFI
2004-11-05	SIO, WHOI, and Informatics	JGOFS Visit: Cyndy Chandler
2004-11-17	CalCOFI Annual Symposium Data Management Workshop	CalCOFI
2005-12-05	CalCOFI Annual Symposium Data Management	CalCOFI
2005-12-07	CalCOFI Annual Symposium DM Workshop Survey	CalCOFI
2005-12-05	CalCOFI Annual Symposium DM Workshop Handout	CalCOFI
2006-03-16	Controlled Vocabularies to Ontologies and Concept Maps Too	LTER & Science Studies: Deana Pennington
2006-08-18	Cyberinfrastructure, Ocean Informatics, and Data Management	JOGS visit: Cyndy Chandler
2006-12-08	Ocean Informatics, Design Sessions and a Video	JGOFS visit: Cyndy Chandler
2007-01-23	CCE LTER Information Infrastructure and the Data	CCE LTER
2007-03-01	Ocean Informatics, Cyberinfrastructure and CalCOFI Handout	CalCOFI: Handout
2007-03-01	Ocean Informatics, Cyberinfrastructure and CalCOFI	CalCOFI: Tony Koslow
2007-07-23	Ocean Informatics, Data Integration and EML	LTERNBII: Inigo San Gil
2007-08-18	Data issues, Roles, and Uptake	Library Visit: Anne Grahame
2007-09-05	Data Issues, Roles, and Library Support for E-Science	Library Visit: Anna Gold
2007-11-02	CICESE and SIO: CalCOFI IMECOCAL	CalCOFI IMECOCAL
2007-11-11	DataZoo, Drupal, and APIs	Ocean Informatics: Shaun Haber
2007-11-26	CalCOFI Conference: Information Management	CalCOFI Conference
2008-01-11	Dataturbine, open source, and site specifics	LTER MCR Visit: Sabine Grabner
2008-03-20	Information environments and communication	Library Visit: Kristin Yarmey
2008-04-02	DataZoo and Classroom Use	SIO Education
2008-04-03	Ocean Informatics and Information Systems	WHOI Teleconference: Cyndy Chandler
2008-05-15	Conversations on Metadata	LTER NBII Visit: Inigo San Gil
2008-05-29	UC-LTER Graduate Student & Post-doc Symposium	LTER CCE, SBC, MCR
2008-05-31	Information Management cross-site visit	LTER NTL visit: Barbara Benson
2008-06-16	Ocean Informatics Monograph Write Session	Science Studies: Florence Millerand
2008-07-17	Source code and Sociotechnical Programming Practices	Science Studies: Stephane Couture
2009-06-09	Regional Zooplankton Workshop	PaCOOS: Johnathan Phinney, Karen Baker, Sharon Mesick
2009-06-15	Ocean Informatics Exchange	Science Studies: Sonja Palfner
2009-07-13	Site Exchange, Cross-synthesis Comparison, and Governance	LTER SGS Visit: Nicole Kaplan
2010-03-06	Information Exchange and Information System Elements	LTER MCR Visit: Mary Gastil
2010-05-24	LTER Unit Registry	LTER KBS Visit: Sven Bohm
2010-08-01	LTER Unit Registry	LTER SEV Visit: Ken Ramsey
2010-11-12	Units and Governance	LTER LUQ Visit: Eda Melendez
2010-12-04	Information Systems	LTER MCR Visit: Mary Gastil
2010-12-10	Site-Site Discussion	LTER CAP Visit: Philip Tarrant
2011-03-11	Music, Business and Scientific Digital Delivery	Ocean Informatics: Shaun Haber

1 Event Flyer
Date: 2003-12-10
Title: US Joint Global Ocean Flux Study and Data Systems
Description: JGOFS Visit: Cyndy Chandler

US Joint Global Ocean Flux Study and Data Systems

SIO/IOD-LTER/OIC & WHOI/JGOFS
Integrative Oceanographic Division, Scripps Institution of Oceanography, UCSD
Data Management Office, US Joint Global Ocean Flux Study, Woods Hole Oceanographic Institute

10 December 2003

Karen S. Baker, Jerry Wanetick, Steve Jackson, Bren Mills
Dawn Rawls, Charleen Johnson, Cyndy Chandler

3
Event Date: 2004-10-18
Title: PACOOS-CalCOFI Data Management Meeting
Description: PACOOS-CalCOFI New
Author: Karen Baker

CalCOFI Data Management Meeting Summary – 18 Oct 04

Karen Stocks, Karen Baker, David Allison, Richard Charter, Sherri McCann, Stephen Diggs, Ralf Goericke, Mati Kahru, Gregory Mitchell, Mark Ohman, Fernando Ramirez, Christian Reiss, Jennifer Sheldon, Jerome Wanetick, Jim Wilkinson, Dave Wolgast



This meeting brought together participants at SIO and SWFSC interacting with CalCOFI-related datasets in diverse ways. Karen Stocks and Karen Baker, tasked with forward planning in support of ongoing CalCOFI data management teams, coordinated the meeting. They opened with a presentation that covered 1) a consideration of local efforts within the context of emerging institutional, regional and national partnerships (Figure A); 2) an outline of generic data system with elements from the ingestion of multiple data types through user query and integration (Figure B); and 3) the activities Baker and Stocks are undertaking and the products they are developing .

A round-table discussion followed during which several themes emerged. First, that the integration of data is important for supporting analysis and visualization. Second, that metadata, standards, exchange protocols, and core categories (that is, joint nomenclature and language) play a critical role in data systems. Although the range of tasks is large and the data/system/organizational relationships complex, participants initiated two key processes: shared infrastructure and information flow. A series of products and processes were discussed including a recent PACOOS proposal to fisheries and a data management presentation at the upcoming CalCOFI Conference (Figure D). In addition, a personnel directory and a dataset inventory were handed out with a request for edits and updates. A follow-up technical mini-meeting will be planned for December after the November cruise, at which standards, metadata, and data integration will be considered in detail. Meanwhile, a critical issues list was begun and will be circulated prior to the next meeting.

-Critical Issues

- Inventory local datasets, data types, and data sizes as well as expectations and resources
- Prioritize data tasks and expectations with respect to resources
- Identify and prioritize user community participant groups and products
- Develop mechanisms for participants to engage in identifying requirements and designing the system
- Articulate and bridge local individual metadata standards and formats
- Identify national metadata standards and exchange protocols
- Identify a data system model and mechanisms to interface with local systems
- Create a shared information infrastructure for diverse groups and diverse data types
- Consider how to build out and support partnerships
- Identify critical field collection-data system factors such as station name conventions and reporting formats
- Establish assessment mechanisms to ensure the system meets and continues to meet user needs

3
Event Date: 2004-11-05
Title: SIO, WHOI, and Informatics
Description: JGOFS Visit: Cyndy Chandler
Author: Karen Baker

SIO, WHOI, and Informatics

November 05, 2004

CCS conference room (at the foot of the SIO pier)

The Ocean Informatics Exchange Workshop continues a dialogue initiated last year between folks managing oceanographic field data at SIO and WHOI. We are doing some forward planning with respect to the multiple dimensions of infrastructure and the design process for a contemporary information environment appropriate for communities in general as well as for organizations such as the SIO Integrative Oceanography Division (IOD).
-Karen Baker, Jerry Wanetick, and Cyndy Chandler

Agenda

9:00 Agenda & Logistics (Baker))
    Welcome (Guza)
9:15 Introductions (round-table)
9:30 Reviewing Past and Present
    - Conceptual Model
    - Tensions/Balances
    IOD Context (Wanetick)
10:30 Break
11:00 WHOI Context (Chandler)
11:15 Semantics and Terms
    Informatics: Historical Perspective
    Informatics: Domain Perspective
11:45 Wrap-up
12:00 Meeting review (round-table)
12:15 Lunch

Participants

Karen Baker, SIO, kbaker@ucsd.edu
Cyndy Chandler, WHOI, cchandler@whoi.edu
Art Gaylord, WHOI, agaylord@whoi.edu
Shaun Haber, SIO, srhaber@ucsd.edu
Florence Millerand, LCHC, fmillera@ucsd.edu
Dawn Rawls, SIO, drawls@ucsd.edu
Uwe Send, SIO, usend@ucsd.edu
Karen Stocks, SDSC, kstocks@sdsc.edu
Wayne Suiter, SIO, wsuiter@ucsd.edu
Julie Thomas, SIO, jothomas@ucsd.edu
Jerry Wanetick, SIO, jwanetick@ucsd.edu
Lynn Yarmey, SIO, lyarmey@ucsd.edu

4
Event Date: 2004-11-17
Title: CalCOFI Annual Symposium Data Management Workshop
Description: CalCOFI New
Author: Karen Baker

Southwest Fisheries Science Center NOAA Fisheries
Scripps Institution of Oceanography
California Department of Fish and Game

CalCOFI Annual Conference 2004
California Cooperative Oceanic Fisheries Investigations



CalCOFI Data Management
17 Nov 2004 Wednesday

CalCOFI Data Management: Today and Beyond
Karen I. Stocks and Karen S. Baker
1440-1500 Presentation, Sumner Auditorium

Integrating CalCOFI Datasets in a Web-Based Browser
Steve Diggs and Christian Reiss
1530-1730 Poster, IGPP Munk Conference Room, in IGPP

Data Management Workshop
K.Stocks, K.Baker, S.Diggs, C.Reiss, R.Charter
1630-1800 Helen Raitt Room, 3rd floor SIO library



5
Event Date: 2005-12-05
Title: CalCOFI Annual Symposium Data Management
Description: CalCOFI
Authors: Karen Baker

CalCOFI Conference and Data Management

CalCOFI Conference (http://calcofi.org)
Scripps Institution of Oceanography, Sumner Auditorium
5-7 December 2005
Southwest Fisheries Science Center, NOAA Fisheries
Scripps Institution of Oceanography
California Department of Fish & Game

Agenda with Data Management Components Highlighted

Monday, 5 December 2005
Mon: 11:00am-1:00pm CalCOFI Registration Opens: Sumner Auditorium Portico
Mon: 1:00pm-1:30pm Welcome & Opening Remarks: Elizabeth Venrick & Charleen Johnson
Scripps Institution of Oceanography, La Jolla, CA
SESSION I: STATUS OF THE CALIFORNIA CURRENT
SESSION II: STATUS OF CALIFORNIA'S FISHERIES
RECEPTION / DINNER
Mon: 5:30pm-9:00pm Reception & Catered Buffet Dinner
(Upper Campus - Eucalyptus Point Conference Center)

Tuesday, 6 December 2005
Tues: 08:00am-8:30am Registration – Sumner Auditorium Portico
SESSION III: Symposium of the Conference: "CalCOFI: The sum of the parts"
Moderator: Elizabeth Venrick - Scripps Institution of Oceanography, La Jolla, CA
Tues: 1:30pm-2:10pm California Current Ecosystem, the newest Long Term Ecological Research
(LTER) site – Mark D. Ohman, Scripps Institution of Oceanography, La Jolla, CA

Tues: 4:30pm-7:30pm POSTER PRESENTATIONS, Wine & Cheese Reception
(Vaughan Hall 100; north side of Sumner Auditorium)
Distribution of CalCOFI Report, Volume 46
DM Poster:
DM Poster:

SESSION V.: WORKSHOPS
Wed: 1:30pm-2:30pm DATA MANAGEMENT WORKSHOP - Karen S. Baker1, Richard Charter2, and James Wilkinson1
1Scripps Institution of Oceanography, La Jolla, CA
2Southwest Fisheries Science Center, La Jolla, CA

Wed: 2:30pm-3:30pm PACOOS SAMPLING STRATEGIES ESTABLISHING REGIONAL
COHERENCE WITHOUT SACRIFICING LOCAL TIME SERIES - Bill Peterson1 and Dave Checkley2
1 NOAA/NMFS/NWFSC, Hatfield Marine Science Center, Newport, Oregon
2 Scripps Institution of Oceanography, La Jolla, CA

6
Event Date: 2005-12-07
CalCOFI Annual Symposium
DM Workshop Survey
CalCOFI
Karen Baker

10 Question DM Survey

CalCOFI Conference - DM Workshop
Scripps Institution of Oceanography
December 7, 2005

Community Building

1. Are you familiar with the topic of information management in the context of a scientific research program?
   (circle one) Yes Somewhat No

2. When would you be interested in discussing your data management practices?
   (circle one) Now Soon Later Never

3. How would you be interested in discussing IM, ie listserves, meetings, community forums
   ____

4. Are you using or interested in using web-based collaborative applications, ie Blog, Wiki, etc?
   (circle one) Yes Maybe No

5. What element(s) of an annual CalCOFI DM meeting interest you the most?
   ____
   ____

Data

6. What types of data do you work with?
   ____
   ____

7. What data formats do you work with?
   ____
   ____

8. What approach to data interoperability and exchange do you use now or aim to use?
   ____
   ____

Wrap-Up

9. List key words/phrases that capture what CalCOFI DM means to you/your work.
   ____
   ____

10. Is there anything else you would like to share?
   ____
   ____

Name ____
Email ____
Organization/Dept/Div ____
Disciplinary Specialty ____
Other DM communities you are familiar with___________________________
Other DM communities you coordinate with ___________________________

Thank you for your input!

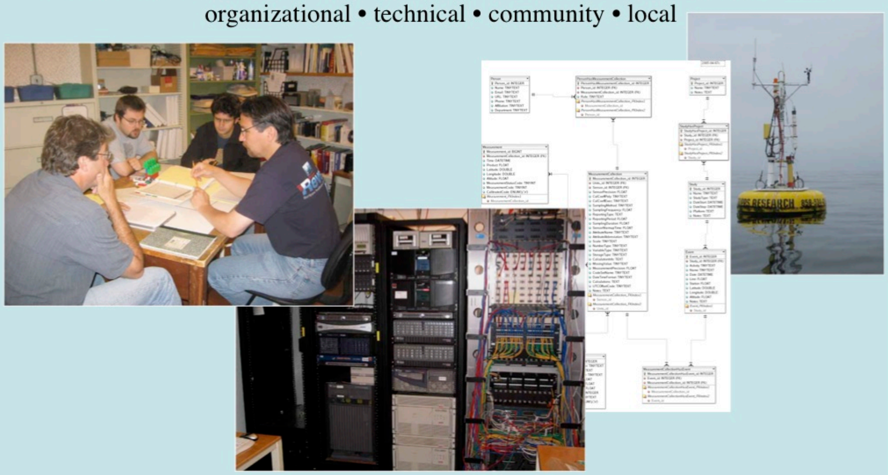
Please return survey to Florence Millerand or Karen Baker
2252 Sverdrup Hall; 858-534-2350

7
Event Date: 2005-12-05
CalCOFI Annual Symposium DM Workshop Handout
CalCOFI
Karen Baker

CalCOFI Conference: DM Workshop Handout

A Conceptual Framework for Marine Science Information Management

Toward shared **Infrastructure** Promoting Resource and Data Interoperability
organizational • technical • community • local



Joint Database Design Teams

Heterogeneous Data Types: shipboard underway, event logging, survey data, in situ automated & manual shore stations, moorings, mets, and gliders

Cyberinfrastructure Endeavors

Federated Data Flows: centers, applications, services, transport, and information systems support

Data/Information Managers as Designers/Mediators

Community Building Mechanisms: workshops, standards, best practices, reading groups, MMI, SIO Webheads

NOA
A

CalCO
FI

LTER

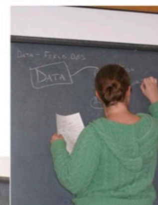
SCCOOS

CalCOFI Conference 2005
Data Management Workshop

[1]Baker, Jackson, Wanetick, 2005 System Science Proceedings
Towards an Ocean Informatics Environment, HICSS05

8
Event Date: 2006-03-16
Controlled Vocabularies to Ontologies and Concept Maps Too
LTER & Science Studies: Deana Pennington
Karen Baker

Controlled Vocabularies to Ontologies and Concept Maps Too



UCSD/SIO/IOD 16 March 2006

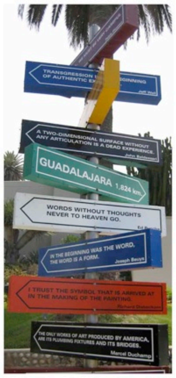
Working Group and Workshop
with Deana Pennington

Agenda:
0700-0800 Breakfast
0830-0930 HSD Poster & Dictionary (FM,KB)
9:30-1000 Knowledge Representation (Deana)
1000-1100 John Porter Conference Call
1115-12:30 Data to Knowledge (OI Workshop)
1230-1330 IOD Luncheon
1330-1400 break
1400-1500 Cyberinfrastructure (LTER CCE)
1530-1630 coffee& debrief

Artifacts:
Informatics Concept Map (OI Report)
Information Infrastructure Design Matrix (Florence, Karen)
controlled vocabulary, dictionary, metadata standard, ontology
Metaphor Drawings
Workshop Concept Maps
Paper Outline Sketch
Recordings & Photos

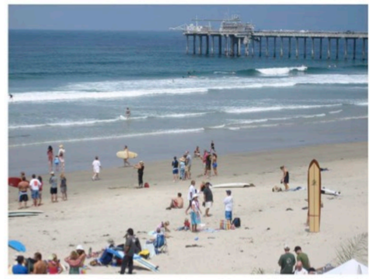
Creating a Knowledge Framework
1. The pieces (dp)-what structural elements add what functions
uncontrolled vocab, controlled vocab, taxonomy, thesaurus, dictionary, ont
2. controlled vocabulary (jp) query interface group
3. unit registry & attrib dictionary (kb)
4. ontology
5. shared vision - how we link together
we get a plan and let folks know

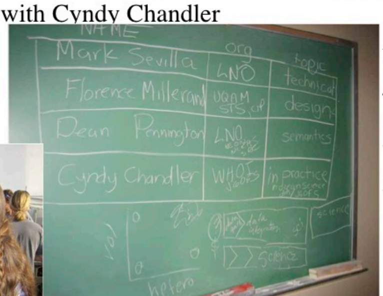
9
Event Date: 2006-08-18
Cyberinfrastructure, Ocean Informatics, and Data Management
JOGS visit: Cyndy Chandler
Karen Baker



Cyberinfrastructure, Ocean Informatics, and Data Management

UCSD/SIO-/IOD 18 August 2006
Cyberinfrastructure, Ocean Informatics,
And Data Management
with Cyndy Chandler





Agenda:
3:30-4:00 Introductions
4:00-5:30 Cyberinfrastructure Overview
5:30-6:00 Wrap Up and Round-Table
6:00-7:00 Surfside TGIF

Sustaining the Dialogue
1) Infrastructure
2) Cyberinfrastructure
3) Workshop vs local CI
4) Meeting the needs of data collectors, managers, users

Artifacts:
- OI Visiting Scholar Table
- CSIG06 Topic Prompts
- Data Collection-Processing-Delivery Distribution Arrow
- Photos

Summer Institute CSIG06 - GEON
cyberinfrastructure for geoscientists
http://www.geongrid.org/CSIG06/
* Focus: introducing geoscientists to commonly used as well as emergent technology
* Topics: Web Services, Workflows, Knowledge Representations, and Geographic Information Systems
* Key Words : ontology and ontology-based search

10
Event Date: 2006-12-08
Ocean Informatics, Design Sessions and a Video
JGOFS visit: Cyndy Chandler
Karen Baker

Ocean Informatics, Design Sessions and a Video

UCSD/SIO 8 December 2006
Ocean Informatics, Design Sessions and a Video
with Cyndy Chandler (WHOI)

Sustaining the Dialogue
1) Dialogue
2) Dictionaries
3) Information Systems
4) Joint Writing

Artifacts:
- Paper OI: A Process in Practice
-List: Lessons learned
-Design Studio
- Video
- Photos

Cross-case analysis: JGOFS-PAL
Twelve Lessons Learned

Guiding Principles
1) Informatics support
2) Data teams
3) Joint products
4) Data reuse

Local practice
5) Community communication
6) Data description
7) Data quality
8) Data policy

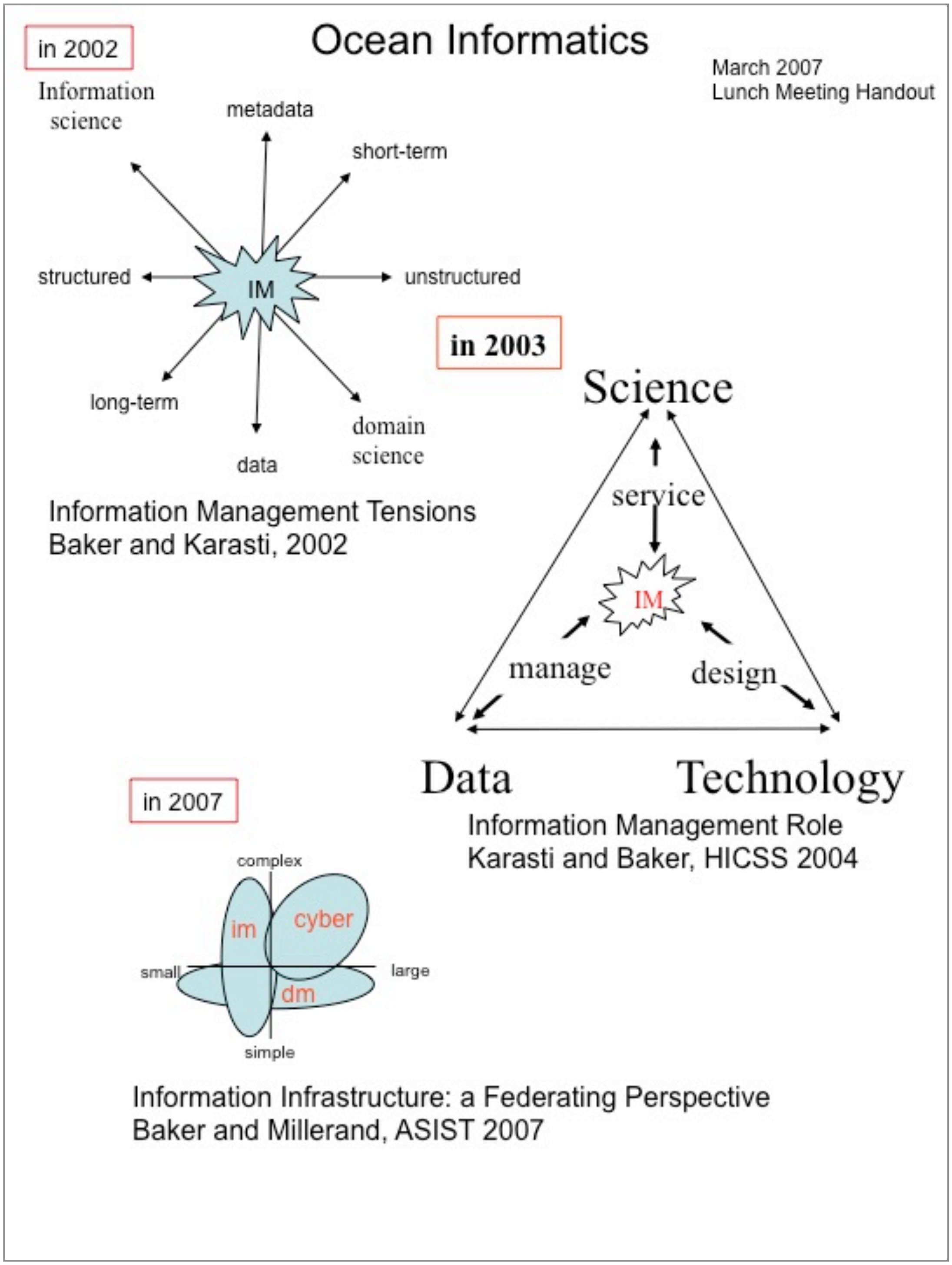
Local approaches
9) Information environment
10) Information infrastructures
11) Adaptive strategies
12) Local repositories

Agenda
7:30-9:00 Breakfast
9:00-9:30 Prepare Lessons Learned
10:00-11:00 Design Session: Participant Lists
12:00-1:30 Lunch and Lessons Learned
1:30-2:15 Poster Discussion: Event Logger
2:15-2:45 Design Session: Parameter Dictionaries
2:45-3:15 Design Session: Gazetteers
4:00-5:30 Paul Otlet video
5:30-6:30 Surfside TGIF

11
Event Date: 2007-01-23
CCE LTER Information Infrastructure and the Data
CCE LTER Annual Meeting
Karen Baker

TUESDAY, JAN. 23rd, 2007		
MUNK Lab Conference Room (Rm 303 - western most room)		
Time	**Participant**	**CCE element/topic**
8:45 a.m.	ALL	Coffee and bagels
9:00	Mark Ohman	Overview and developments in the National LTER Network
9:15		
9:30	Ralf Goericke	**Augmented CalCOFI measurements**
9:45		Progress, results and problems
10:00	Lihini Aluwihare	Dissolved organics - DOC/DON data
10:15	Andrew King	Phytoplankton & biogeochemistry of Fe
10:30	Melissa Soldevilla	Marine mammal acoustics
10:45	Dave Checkley	Bongo-LOPC data (also process cruises)
11:00	***COFFEE BREAK***	
11:15	Alison Cawood	ZooScan analyses
11:30	Mati Kahru	**Other time-series meas.** - Remote sensing
11:45	Hey-Jin Kim	Nearshore long-term observations of surface Chl
12:00	Russ Davis/Mark Ohman	gliders
12:15		DISCUSSION: INTEGRATION OF MEASUREMENT PROG
12:30	***LUNCH BREAK***	Catered deli box lunches/drinks
		GRAD. STUDENT meeting/lunch (see A. King and B. Hopkinson)
1:30	Mike Landry	**Process Cruises**
1:45		Overview and results
2:00		DISCUSSION: PROCESS CRUISE DESIGN AND RESULT
2:15	Peter Franks	**Modeling**
2:30	Steven Bograd	Control volume concept
2:45	Pascal Riviere	A high resolution nested modeling framework
3:00	Hey-Jin Kim	Stratification/upwelling cells + nutrient supply
3:15		DISCUSSION: MODELING APPROACHES AND INTEGRA
3:30	***COFFEE BREAK***	
3:45	Karen Baker	**Information Management**
4:00		Data & the CCE information system
4:15		DISCUSSION: AN INTEGRATED INFORMATION SYSTEM
4:30	Beth Simmons	**Education and Outreach**
4:45		Outreach venues, projections & synopsis
5:00	Kathy Barbeau	Recruitment of REUs
5:15	Ralf Goericke	CCE - Japan exchange
5:30	Mark Ohman	Priorities for 2007 Supplement requests
5:45 p.m.	refreshments	
Please note venue change and earlier start time on Wed.!!		
WEDNESDAY, JAN. 24th, 2007		
REVELLE Lab Viz Center (4th floor, NE side on footbridge level) - IGPP		
Time	**Participant**	**CCE element/topic**
8:15 a.m.	ALL	Coffee and bagels
8:30	Small groups	Break-out session regarding manuscript writing and other collaborations

12
Event Date: 2007-03-01
Ocean Informatics, Cyberinfrastructure and CalCOFI
CalCOFI: Handout
Karen Baker



13
Event Date: 2007-03-01
Ocean Informatics, Cyberinfrastructure and CalCOFI
CalCOFI: Tony Koslow
Karen Baker

Ocean Informatics Event
UCSD/SIO - 1 March 2007

Ocean Informatics, Cyberinfrastructure and CalCOFI
with Tony Koslow and Florence Millerand

Sustaining the Dialogue

Ocean Informatics events are held routinely though aperiodically as a long-term forum for communication, cooperation, and camaraderie regarding all things informatics, design, and/or digital related.

Sustaining the Collaboration

Attendees
Tony Koslow - CalCOFI Director
Florence Millerand - OI Human Social Dynamics
TJ Moore - SWFSC/NOAA GIS
Shaun Haber - OI ProgrammerAssociate
Beth Simmons - Edu/Outreach PAL&CCE LTER
Jerry Wanetick - OI & IOD Comp.Infrastructure
Jesse Powell - Grad Student CalCOFI/CCE
Andrew Taylor - Bio Technician, CCE/Landry
James Conners - OI Programmer/Student
Mason Kortz - OI ProgrammerAnalyst
Robert Thombley - CalCOFI Programmer
Lynn Yarmey - OI ProgrammerAnalyst
Laurie C - Bio Technician, CCE/Aluwihare
Jim Wilkinson - CalCOFI ProgrammerAnalyst
Charleen Johnson - OI Logistics & Transcription

Agenda

12:00 Lunch
12:15 Roundtable Introductions
12:20 Tony Koslow: welcome and background
12:30 Florence Millerand: welcome back & updates
12:45 IOD web logo: The Swash (poster presentation)
12:45 Digital Landscape Figure
Roundtable Discussion
All Day Interviews

Artifacts:

Handout Digital Landscape
-Tensions
--DM Role
--Cybeinfrastructure
The Swash Logo Poster
Pirate, Knights, and small figures
Photos

14
Event Date: 2007-07-23
Ocean Informatics, Data Integration and EML
LTERNBII: Inigo San Gil
Karen Baker

Ocean Informatics, Data Integration and EML with Inigo San Gil

UCSD/SIO - 23-24 July 2007

NBII, Network & Site Coordination

Ocean Informatics events are held as a long-term forum for communication, cooperation, and camaraderie regarding all things data and design, informatics and information infrastructure.

Sustaining the Dialogue

Attendees

Inigo San Gil - LTER Network Office & NBII
Karen Baker - PAL& CCE IM
Tony Koslow - CalCOFI Director
Jerry Wanetick - OI & IOD Comp.Infrastructure
James Conners - OI ProgrammerAnalyst
Mason Kortz - OI ProgrammerAnalyst
Robert Thombley - CalCOFI Programmer
Lynn Yarmey - OI ProgrammerAnalyst
Jim Wilkinson - CalCOFI ProgrammerAnalyst
Rich Charters - SWFSC
Susie Campbell - SWFSC
David Jorgensen - OI ProgrammerAnalyst
Andrew Taylor - Bio Technician, CCE/Landry
Charleen Johnson - OI Logistics & Transcription

Agenda

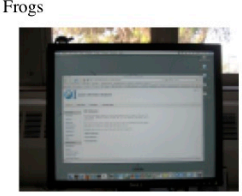
Monday
09:00 DataZoo & EML data publishing
12:00 Lunch Meeting (Vaughn Hall)
01:30 Metadata, unit/attribute dictionary & data integration
02:30 IOD visit and coffee
03:30 PASTA and data provenance
08:00 Dinner

Tuesday
09:30 Web Modules
10:00 Keywords, thesaurus, and FGDC-BPD
12:00 Lunch & Pier Walk
01:30 Wrap-up

Artifacts:

Handout Data Integration
- -ASM03: Decade of Synthesis!?
- -LTER Decades
- -Key issues & Key views

Turtles, Tortises, and Frogs
Photos
DataZoo 2.0

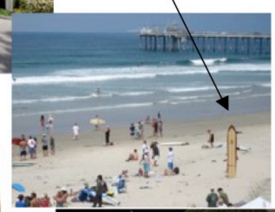


15
Event Date: 2007-08-18
Data issues, Roles, and Uptake
Library Visit: Anne Grahame
Karen Baker

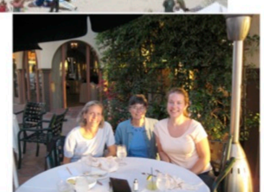
Library Informatics: Data Issues, Roles, and Uptake with Anne Graham

UCSD/SIO - 18 August 2007

Sustaining the Dialogue



Snippets: roles, semantics, data structure, library as repository, cultural side, uptake, datasets for publication, Digital curation, archive vs preservation, DSpace, Dataverse, rdf



Ocean Informatics events are held routinely though aperiodically as a long-term forum for communication, cooperation, and camaraderie regarding all things informatics, design, and/or digital related.

Agenda

12:00 GeoSciences Summer Institute end
2:30 SIO Shuttle
2:45 Ocean Informatics Design Studio Introductions
3:00 SIO Library Tour; Peter Breugerman
3:30 OI-UCSD-MIT Library Discussion
5:15 Adjourn
5:30 La Jolla Shores Dinner
7:30 Airport

Attendees
Anne Graham - MIT Librarian
Karen Baker - SIO Information Manager
Lynn Yarmey - SIO Program/Analyst
Mason Kortz - SIO Programmer/Analyst
James Conners - SIO Programmer/Analyst
Jerry Wanetick - SIO/IOD Computation Facility
Declan Fleming - UCSD IT
Ardys Kozbial - UCSD Library
Robert McDonald - SDSC Archive

Listening In:
"Librarians are all about access. Is there going to be a culture clash with the data world? I'm not from the hiding school but from the sharing information school."

"Archive is a co-opted term."

"There's raw data and then there's the article level"

"NSF has begun to ask for data management plans."

"Messy data is one of the nuances of science."

"roles…a liaison to laboratory practices"

"There's the Digital Curation Conference 3 and the Preservation and Added Value Conference PV2007"

16
Event Date: 2007-09-05
Data Issues, Roles, and Library Support for E-Science
Library Visit: Anna Gold
Karen Baker

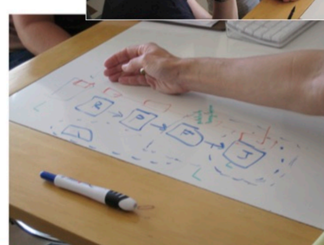
Library Informatics: Data Issues, Roles, and Library Support for E-Science

with Anna Gold

UCSD/SIO - 05 September 2007

Sustaining the Dialogue

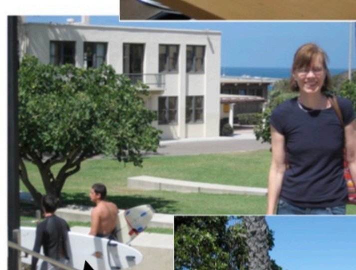
Reading: Association of Research Libraries Draft Report of Joint Task Force on Library Support for E-Science



Ocean Informatics events are held throughout the year as a long-term forum for communication, cooperation, and camaraderie regarding all things informatics, design, and/or digital related.

Agenda

10:00 Design Studio Introductions
10:15 Meet Mark Ohman, Lead PI CCE
10:30 Coffee
10:45 Presentation & Discussion
12:00 Round Table Close



Attendees
Anna Gold - MIT Head Librarian
Karen Baker - SIO/OI Information Manager
Lynn Yarmey - SIO/OI Program/Analyst
Mason Kortz - SIO/OI Programmer/Analyst
James Conners - SIO/OI Programmer/Analyst
David Jorgensen - SIO/OI Volunteer

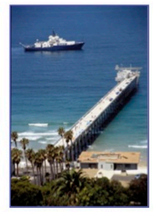
surf's up

cam's up

Listening In:
"there seems to be a lumping together of technical and conceptual issues"
"it depends on the scale of the science"
"the idea of a data package"
"my understanding of e-Science, or at least what I perceived it as, changed"
"there's so much data work to be done and more than enough room"

17
Event Date: 2007-11-02
CICESE and SIO: CalCOFI IMECOCAL
CalCOFI IMECOCAL
Karen Baker

CalCOFI Data Management: CICESE and SIO



UCSD/SIO - 02 November 2007

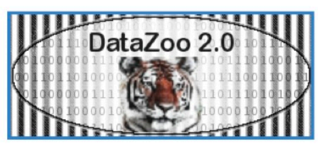
Starting the Dialogue

Ocean Informatics events are held periodically as a forum for communication, cooperation, and camaraderie. This event brought together participants working with data associated with California Cooperative Fisheries Investigations (CalCOFI) from SIO in La Jolla and from CICESE/IMOCOCAL near Ensenada.

Facilities:
Design Studio
Computational Facility
Demos:
Eventlogger
DataZoo

Agenda
11:00 Introductions
11:15 Welcome (Mark Ohman)
11:30 Computer Systems (Jerry Wanetick)
12:30 Eventlogger Demo
13:00 CICESE & SIO data
13:30 DataZoo Demo
16:00 Departure

Attendees
Tim Baumgartner - CICESE/IMECOCAL
Norma Ramirez - CICESE/IMECOCAl Data Manager
Pablo Torres - USABC Computer Science
Karen Baker - SIO/Ocean Informatics
Mason Kortz - SIO/OI Programmer/Analyst
James Conners - SIO/OI Programmer/Analyst



UCSD/SIO/Integrative Oceanography Division:
http://calcofi.org
http://cce.lternet.edu
http://pal.lternet.edu
DataZoo
http://oceaninformatics.ucsd.edu/datazoo

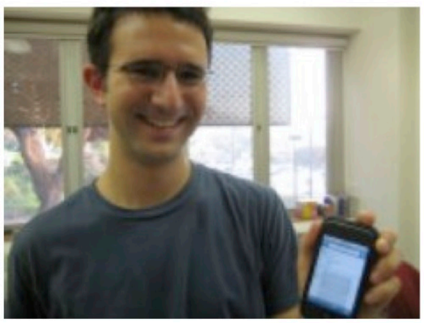
CICESE: Centro de Investigacion Cientifica y de Educacion Superior de Ensenada
IMOCOCAL: Invetigaciones Mexicanas de la Corriente de California
http://www.cicese.mx
http://imecocal.cicese.mx/
http://www.uabc.mx

18
Event Date: 2007-11-11
DataZoo, Drupal, and APIs
Ocean Informatics: Shaun Haber
Karen Baker

DataZoo, Drupal, and APIs

UCSD/SIO - 11 November 2007

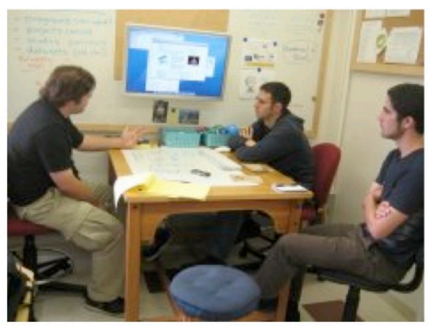
Continuing the Dialogue



Ocean Informatics events are held periodically as a forum for communication, cooperation, and camaraderie. This event brought together participants working to implement technical solutions and to design new solutions in production environments, whether they be scientific research or the music industry.

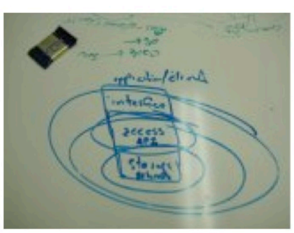
Demos:
Drupal
DataZoo
Facebook

Outcome:
Clarity in identifying a goal to create API interfaces for DataZoo modules, ie PeopleZoo and units.

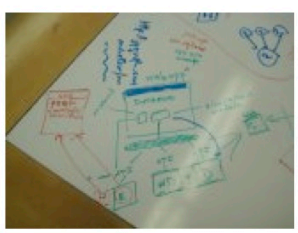


Agenda
12:00 Lunch
12:30 Drupal & DataZoo
17:00 Music Industry and Tech Development
17:30 Departure

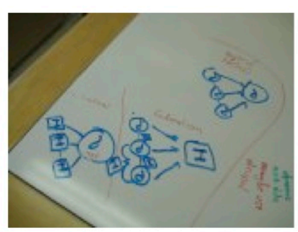
Attendees
Shaun Haber - Warner Brothers
Karen Baker - SIO/Ocean Informatics
Mason Kortz - SIO/OI Programmer/Analyst
James Conners - SIO/OI Programmer/Analyst



Protocol Stack



API, Web Services and Test Console



Centralized, federated and existing hybrid case

19
Event Date: 2007-11-26
CalCOFI Conference: Information Management
CalCOFI Conference
Karen Baker

CalCOFI Conference: Information Management

26-28 November 2007

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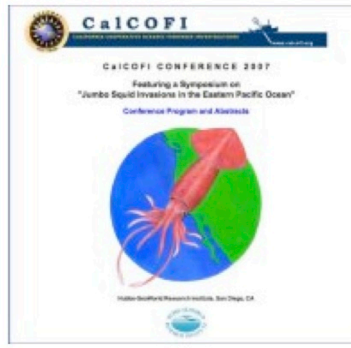
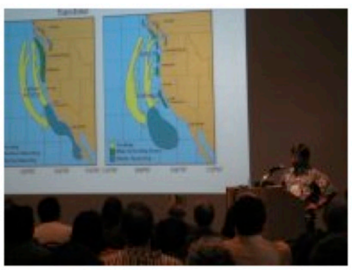
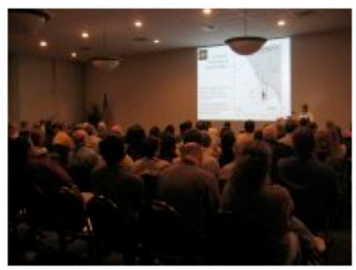
with participation
by CCE LTER
and Ocean Informatics







State of the Current presentation by Ralf Goericke.

Ocean Informatics posters:
• CalCOFI Data Management: Developing Working Standards - Jim Wilkinson, Karen Baker and Rich Charters
• Ocean Informatics Datazoo: A Multi-Project Data Publishing System - Mason Kortz, James Conners, and Karen Baker
• Metadata Standard: Augmenting the Ecological Metadata Language - Lynn Yarmey, Karen Baker, and James Conners
• Oceanographic Event Logger - Jim Wilkinson and Karen Baker

20
Event Date: 2008-01-11
Datatturbine, open source, and site specifics
LTER MCR Visit: Sabine Grabner
Karen Baker

Open source software and site specifics

UCSD/SIO - 11 Jan 2008

CCE, PAL, and MCR LTER
with Sabine Grabner

Open source software and site specifics

Ocean Informatics events are held periodically as a forum for communication, cooperation, and camaraderie regarding all things data and design, informatics and information infrastructure.

Agenda - Friday

11:00 Introductions
12:00 Lunch
01:30 IOD Computational Infrastructure
02:30 Debrief SDSC & Data Turbine
03:30 MCR Information Management Overview
04:30 PAL, CCE DataZoo Overview
05:30 TGIF
07:00 Dinner

Sustaining the Dialogue

Participants
Sabine Grabner - MCR LTER IM
Karen Baker - PAL & CCE LTER IM
James Conners - OI ProgrammerAnalyst
Mason Kortz - OI ProgrammerAnalyst
Lynn Yarmey - OI ProgrammerAnalyst
Jerry Wanetick - OI & IOD Comp.Infrastructure
Mark Ohman - CCE LTER Lead PI

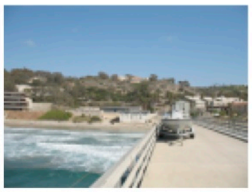
Memorable Quotes:

Re Ocean Informatics SIO: *"It seems like a data or information management sanctuary. It's more like a data management sanctuary than a data management mafia"*
MCR Site Review on Information Environments: *"An information environment isn't something you finish; it's something you start."* (from Baker and Bowker, 2007. Information Ecology: Open System Environment for Data, Memories and Knowing. JIIS)

Example Outcomes

Cross-site translation table:
MCR - OceanInformatics
observable - column
parameter - attribute
Two potential Databits topics
QARTOD qa/qc working group
LNO-site data request coordination

21
Event Date: 2008-03-20
Information Environments and Communication
Library Visit: Kristin Yarmey
Karen Baker



Information environments and communication

UCSD/SIO - 20 Mar 2008

Archive Matters
with Kristen Yarmey

Information environments and communication

Ocean Informatics events are held periodically as a forum for communication, cooperation, and camaraderie regarding all things data and design, informatics and information studies.

Agenda - Thursday

2:30-3:30 Round Table discussion
3:30-4:00 Ecosystems
EBM: ecosystem based management
IBM: infosystem based management
4:00-5:00 Ocean Informatics, Data and DataZoo
5:00-5:30 Wrap Up

Sustaining the Dialogue

Participants

Kristen Yarmey - UMaryland; College of Lib & Info Studies
Karen Baker - OI Information Manager
James Conners - OI PA/IM/Design
Mason Kortz - OI PA/IM/Design
Lynn Yarmey - OI PA/IM/DM

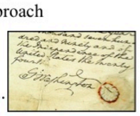
Issues

iSchools and archival programs
Paper: Dear Mary Jane by Fleckner
Focusing on the container or the content
Authority headings and metadata tags

Vocabulary

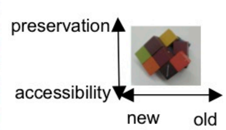
Appraisal-cost to keep it
Beneign neglect-an approach

Consider a letter of George Washington and then a dataset....

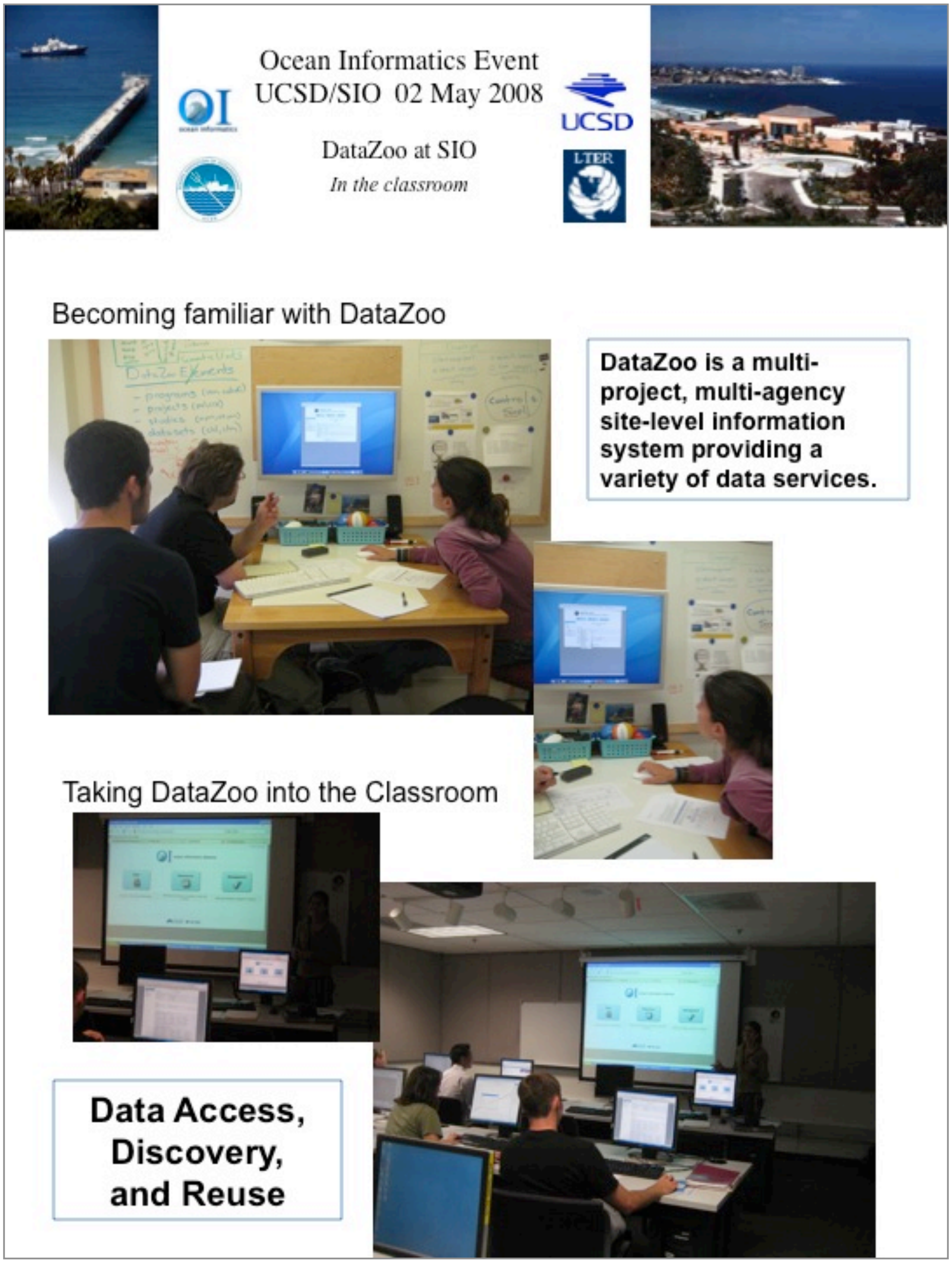


Archivists.org

Memorable Moments:
Information, time, and boundaries: *"It seems there are two world systems: active use and archive ... and preservation is becoming more inclusive.*
A view of repositories: *"A repository is a general name for archives and special collections."*



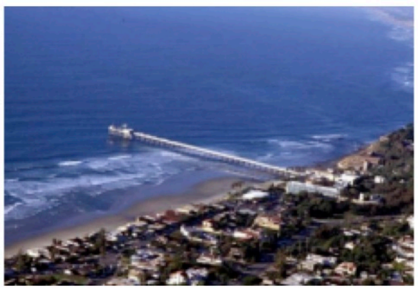
22
Event Date: 2008-04-02
DataZoo and Classroom Use
SIO Education
Karen Baker



23
Event Date: 2008-04-03
Ocean Informatics and Information Systems
WHOI Teleconference: Cyndy Chandler
Karen Baker

Ocean Informatics and Information Systems

SIO-WHOI - 03 Apr 2008



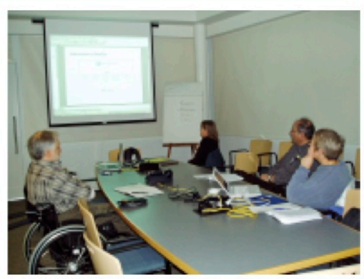
Scripps Institution of Oceanography

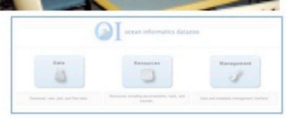
Woods Hole Oceanographic Institute

Ocean Informatics events are held periodically as a forum for communication, collaboration, and camaraderie regarding all things data and design, informatics and information studies.

Agenda - Thursday

8:00-8:10 Introductions (11ET)
8:10-8:15 What is Ocean Informatics? (11:10 ET)
8:15-8:20 What is an Information System? (11:15 ET)
8:20-9:20 What is DataZoo? (11:20 ET)
9:20-9:30 Wrap Up (12:20 ET)





Information System Architecture and Design

Sustaining the Dialogue

Participants

Karen Baker - SIO Information Manager
Mason Kortz - SIO PA/IM/Design
Lynn Yarmey - SIO PA/IM/DM

Chyndy Chandler - WHOI Data Manager
Bob Groman - WHOI Data Manager
Dicky Allison - WHOI Data Manager
Julie Allen - WHOI ApplWeb Programmer
Dave Glover - WHOI Data PI

Memorable Overviews:
Which metadata standard is best to use?: *"All of them"*
BCO-DMO Development: *JGOFS and map server to a new system with RDF triples, Drupal, and DataTracker.*
OI DataZoo: *colocated with community; publishing system; dictionaries, term sets and IOD infrastructure*

24
Event Date: 2008-05-15
Conversations on Metadata
LTER NBII Visit: Inigo San Gil
Karen Baker

Ocean Informatics Event
UCSD/SIO - 15 May 2008

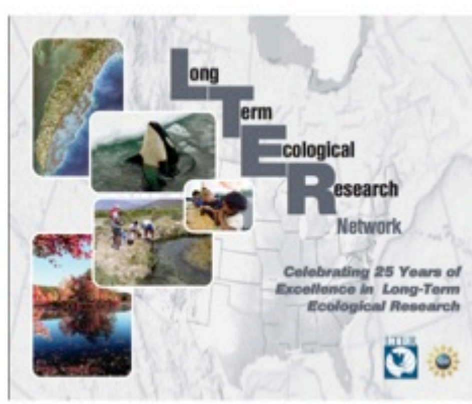
Conversations on Metadata
with Inigo San Gil

Considering information environments and systems

Ocean Informatics events are held periodically as a forum for communication, collaboration, and camaraderie regarding all things data and design, informatics and information studies.

Mobility and Tools

Bringing Together NBII and LTER Efforts



25
Event Date: 2008-05-29
UC-LTER Graduate Student and Post-doc Symposium
LTER CCE, SBC, MCR
Karen Baker

UC-LTER Graduate Student & Post-doc Symposium
29 May 2008 at SIO, UCSD

LTER sites represented at the meeting:
- CCE – California Current Ecosystem
- SBC – Santa Barbara Coastal
- MCR – Moorea Coral Reef

The purpose of the symposium was to allow graduate students and post-docs to share their LTER-related research with each other and the SIO/UC community.

There are several topics unique to LTER research in the marine environment (e.g. population connectivity by advective and biological processes, flexibility in the size structure of primary producers and grazers, carbon flow through the marine ecosystem, close relationships between physical forcing and ecosystem structure). Knowledge of the research conducted by other students at marine sites will facilitate cooperation and discussion. Students from each of the UC-LTER sites plan to continue meeting to share research on an annual basis. There were approximately 30 participants throughout the day's meeting in 4500 Hubbs Hall.

CCE LTER graduate student representative, Ryan Rykaczewski, planned and opened the symposium.

AGENDA

9:30-12:15	Introductions to each LTER site and related research talks
12:15-12:45	Lunch
12:45-2:00	Poster session
2:00-3:30	CCE presentations, cont'd
3:30-3:45	Discussion
4:00	Symposium ends

POSTER SESSION

A poster session was held in addition to presentations. Grad. students Darcy Taniguchi (right) and Andrew Taylor (left) discuss CCE plankton communities.

26
Event Date: 2008-05-31
Information Management Cross-site Visit
LTER NTL visit: Barbara Benson
Karen Baker

27
Event Date: 2008-06-16
Ocean Informatics Monograph Write Session
Science Studies: Florence Millerand
Karen Baker

28
Event Date: 2008-07-17
Source code and Sociotechnical Programming Practices
Science Studies: Stephane Couture
Karen Baker

29
Event Date: 2009-06-09
Regional Zooplankton Workshop
PaCOOS: Johnathan Phinney, Karen Baker, Sharon Mesick
Karen Baker

30
Event Date: 2009-06-15
Event Date: Ocean Informatics Exchange
Science Studies: Sonja Palfner
Karen Baker

31
Event Date:
Visit: Nicole Kaplan
Karen Baker

32
Event Date: 2010-03-06
Information Exchange and Information System Elements
LTER MCR Visit: Mary Gastil
Karen Baker

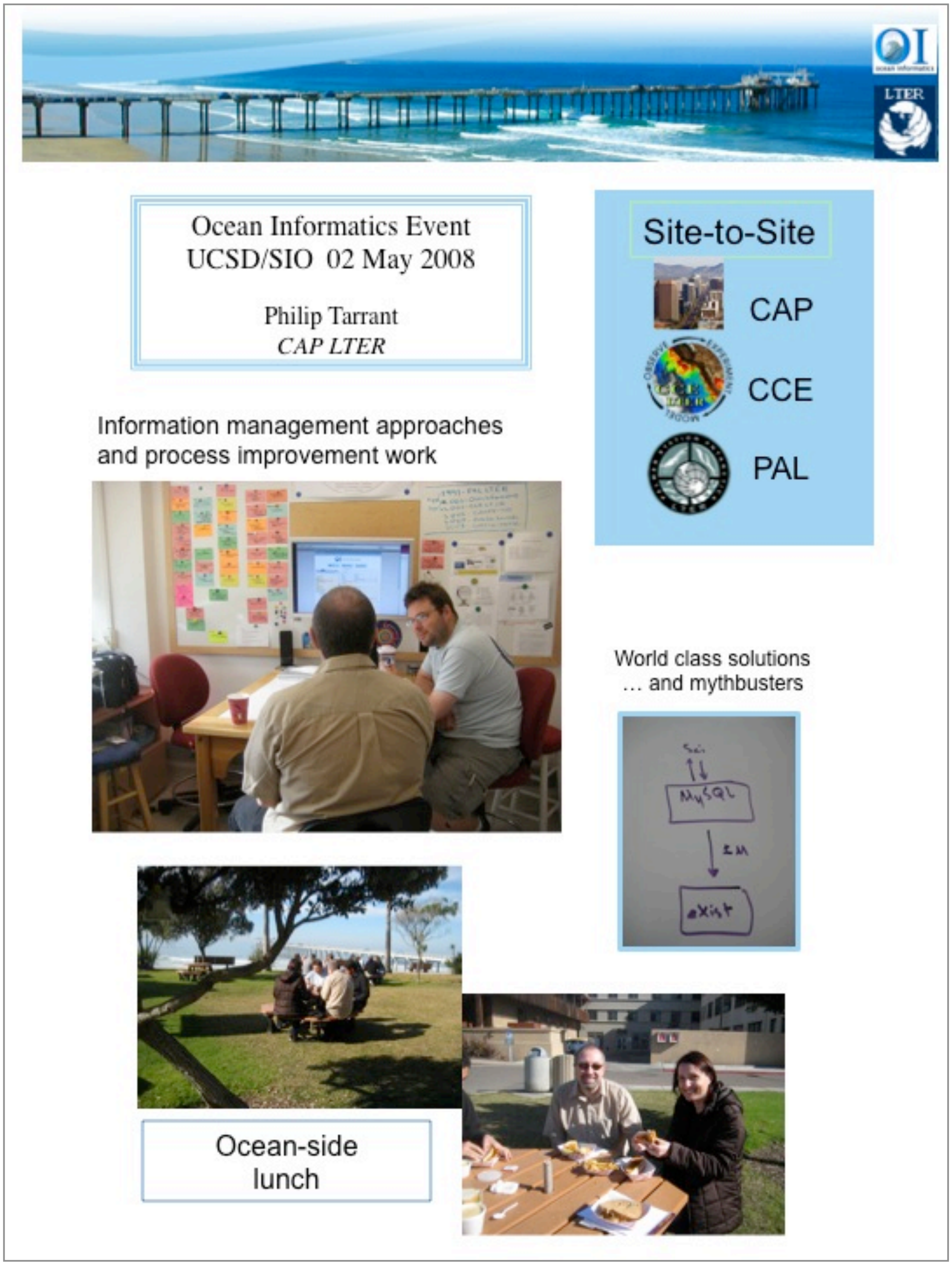
33
Event Date: 2010-05-24
LTER Unit Registry
LTER KBS Visit: Sven Bohm
Karen Baker

34
Event Date: 2010-08-01
LTER Unit Registry
LTER SEV Visit: Ken Ramsey
Karen Baker

35
Event Date: 2010-11-12
Units and Governance
LTER LUQ Visit: Eda Melendez
New Karen Baker

36
Event Date: 2010-12-04
Information Systems
LTER MCR Visit: Mary Gastil
Karen Baker

37
Event Date: 2010-12-10
Site-Site Discussion
LTER CAP Visit: Philip Tarrant
Karen Baker



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Event Date: 2011-03-11
Music, Business and Scientific Digital Delivery
Ocean Informatics: Shaun Haber
Karen Baker