VIVO: Creating a virtual community to foster interdisciplinary research

Or how Leibniz, Ans & Ari van Tienhoven, and Tim Berners-Lee helped us do it.







Janet McCue Director, Mann Library AUL for Life Sciences Cornell University Library Librarians & e-Science (CIC Meeting, May 2008)



Cornell University

Enhancing Science and Engineering at Harvard

"Harvard scientists span the range of the life, physical, medical, and engineering sciences. Their number and range represent both a strength and a weakness. In principle, there are almost limitless opportunities for interdisciplinary collaboration, but our size makes it hard for each investigator to find potential collaborators in the larger community of scholars, especially outside their fields."

> University Planning Committee for Science and Engineering Harvard University December 2006

Cornell's New Life Science Initiative

- Department Open hiring policy;
- Campus wide research & endowment activities;
- Goal: Draw together the "biologists, physicists, chemists, computational scientists and engineers in an atmosphere where traditional departmental and college boundaries become secondary to the intellectual work itself?"



Kathy Chiang Head, Life Sciences and Specialized Services



Medha Devare Bioinformatics and Life Sciences Librarian



Ans & Ari van Tienhoven



Jon Corson-Rikert Head, Information Technology Services

"An essential process is the joining together of subcultures when a wider common language is needed. Often two groups independently develop very similar concepts, and describing the relationship between them brings great benefits. Like a Finnish-English dictionary, or a weights and measure conversion table, the relations allow communication and collaboration even when the commonality of concept has not (yet) led to a commonality of terms."

> *Tim Berners-Lee, James Hendler, Ora Lassila, "The Semantic Web," Scientific American, May 2001*

VIVO is a way to connect people:

- Helps faculty, administrators, and students discover common interests and connections;
- Allows Cornell to transcend the campus, dept, and administrative structures;
- Provides an integrated view of the life sciences at Cornell;
- Uses an entity-relationship model to organize and present information on people, research, and education activities;
- Leverages concepts and standards from the semantic web community to provide seamless access to diverse resources;
- Supplements the discovery power of search engines by presenting each displayed page in a context of related information;
- Provides a discovery and navigation layer about the 10M diffuse webpages at Cornell.



VIVO

VIVO - A Service of Cornell University Library

Browse or search VIVO to discover who's working on a particular research topic; what they've taught or published recently; where facilities might be and what online tools are available to expedite research.



Searching VIVO: use the s	shortest term yo	u can (e.g., "rice" instead of "rice research", or the last name only for people searches); see search tips for more help
Search examples:		
nanofab*	search!	(an asterisk matches variations at the beginning or end of words)
"climate change"	search!	(a leading quote indicates you want to search for a phrase, not individual words)
crystallography	search!	

VIVO is an ongoing project of the Life Sciences Working Group in the Cornell libraries, and coverage is not yet complete. At present we are adding content from the College of Engineering and Weill Cornell Medical College. Please contact us if you or your unit should be included in the site, or if you have any corrections, comments, or suggestions for improvements. You may also speak with Medha Devare at 255-2199.

Life Sciences in the Library

The Cornell Library is your gateway to life sciences information and services. The Cornell New Life Sciences Initiative (NLSI) is a university-wide both at Cornell and in the worldwide community.

- Bibliographic Databases
- Library Services
- Cornell Unit Libraries

New Life Sciences Initiative

collaboration that will enhance and support life sciences research and education. It is the most far-reaching research initiative in Cornell's history.

Focus Areas

Cross-campus and Collaborative Initiatives

Cross-campus and collaborative activities, projects, and other items of special interest in relation to the life sciences at Cornell.

Ithaca - Weill Medical College Collaboration

Life Sciences News

News features relating to recent life sciences research achievements or activities at Cornell.

Sustainability center names three new associate directors | Cornell Chronicle feature | 05/02/2008 Chronicle feature

The Cornell Center for a Sustainable Future (CCSF) has named three new associate directors who will use their expertise in three key areas -energy, environment and economic development - to connect Cornell's research and scholarship to sustainability.

Mother's Day special: With straw and plastic, a one-acre flower is 'painted' for sky viewers | Cornell Chronicle feature | 05/02/2008 Chronicle Feature



On May 11, a group of Cornell students will unveil a temporary artwork titled "Turfwork!," intended to be viewed from the air.





science education | collaborative research area (CALS)

Sample search in VIVO: "proteom*"

life sciences Education & Training Research Tools Facilities Home People VIVO Index About Contact Us Search Results Jump to results of type: people activities events organizations online resources publications places people Cornell Faculty Member (41) Beer, Steven V. | Professor Begley, Tadhg P. | Professor Bensadoun, Andre | Professor Emeritus Beyenbach, Klaus W. | Professor Cadle-Davidson, Lance E. | Assistant Adjunct Professor ± 36 more Cornell Academic Staff (3) Blankenship, James E. | Senior Lecturer Friso, Giulia | Research Associate Zhang, Sheng | Director of Proteomics & Mass Spectrom Facility

activities

Cornell Semester Course (3) Molecular Principles of Biomedical Engineering | 3 credit course

Plant Biochemistry | 3 credit course

Plant Molecular Biology II | 1 credit course

Graduate Field/Program (2) Pharmacology (Weill) | biomedical graduate program of study Tri-Institutional Program in Computational Biology and Medicine (CBM) | graduate program

Research Area (2) proteomics | research concentration area (Engineering) systems biology and biomedical engineering | strategic research area (Engineering)

Research Grant (10)

A HYBRID QUADRUPOLE TIME-OF-FLIGHT TANDEM MASS SPECTROMETER INTEGRATED WITH UPLC FOR CHARACTERIZATION OF PROTEIN COMPLEXES AND COMPARATIVE PROTEOMICS | Research Grant



Cornell University College of Agriculture and Life Sciences

Teaching	Research	Extension
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Developing leaders. Improving lives.



CALS > CALS Research

CALS Research Portal

The CALS Research Portal helps you find information about the people, grants, collections, projects, events, and the facilities that make the CALS research environment so vibrant.

Search the portal

To retrieve more results, use fewer and broader terms (e.g., "cognitive" instead of "cognition disorders"); to find people, start with the last name only; see search tips for more help.



Browse the portal by academic priority

Welcome to CALS Research

CALS has a long tradition of discovery and scholarship from the social sciences to the environmental sciences to life sciences. Our researchers are among the best in the world, with world-class facilities at their disposal. We engage in cutting-edge research and technology transfer with the goal of improving the lives of people in the state, nation, and throughout the world.

Academic Priorities

There are four priority areas of research in the College of Agriculture and Life Sciences — Land-Grant Mission, Applied Social Sciences, Environmental Sciences, and New Life Sciences — all of which correspond to the College's Academic Priorities. Please use the search box to the right or browse with these links to explore information about research in specific academic priority areas.

Research in CALS is administered through the Office of the Senior Associate Deans. This office reviews, identifies, implements, facilitates, and communicates the College's research priorities. This Research Portal is an example of a comprehensive project which brings together and disseminates information about research activities throughout the College.







Academic reporting dataflows

- VIVO combines

 authoritative data from
 central databases with
 self-reported data on
 academic and research
 activities
- Integrated data syndicated for Web display
- "Faculty as academic" data from VIVO combined with "faculty as employee" data for administrative reporting



VIVO in 2003:

- Potential benefits of Semantic Web technologies clear but tools & work applications scarce;
- Designed and built our own software that emulated the performance of Semantic Web applications but still relied on conventional relational database technologies.

VIVO in 2008:

- Tools available to leverage standard formats have matured considerably;
- RDF/XML data and OWL ontologies can be exchanged with other systems;
- Data consistency with the underlying model can be checked;
- Inference engine updates categorizations used to filter and aggregate data in real time
- SPARQL query language takes advantage of rich data model to allow more nuanced displays and highly tunable data feeds to other websites

Semantic Web Technologies are ready for production use at least at the scale of VIVO and can provide real benefits.



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Graduate Programs in the Life Sciences

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Explore our Graduate Fields



Applied Biology



Ecology, Evolution, and Integrative Biology

Genetics, Genomics, and Bioinformatics

Molecular and Cellular Biology

Physical, Chemical, and Computational Biology

On campus, a biorevolution has transformed research. Biology is no longer just being done by biologists. Scientists and scholars from traditionally separate disciplines pursue biological questions and work with biological systems and biologists.

Begin the process of studying in one of the world's most exciting and diverse academic environments.



Life Sciences News





Planetary scientist Don Campbell named director of Cornell center that manages NSF's Arecibo Observatory With Cornell's help, a glorious Saturn steps into the spotlight in New York City

more news »



Life Sciences Seminars

Monday, May. 5 Indonesia's Statistical Agency and Its Data

Monday, May. 5 Adolescent Obesity in the U.S. Virgin Islands, The First Measurement Survey: Implications of Environmental Factors & Migration

more events »



Graduate Programs in the Life Sciences

Graduate Fields



Graduate Field of Neurobiology and Behavior

The graduate program aims to advance the understanding of neurobiology and behavior by encouraging a free interchange of ideas and techniques among students and faculty. Thus a student might employ the techniques of immunocytochemistry and intracellular recording in one aspect of a project while conducting ecological surveys to study other aspects of the same project. Informal exchanges of ideas and information go on in laboratories and in weekly journal clubs, which draw undergraduate and graduate students, postdoctoral associates, and faculty members from across the campus to discuss articles and themes of current interest.

Meet our Faculty



Adkins-Regan, Elizabeth rofessor



Adler, Kraig A. Professor of Biology



Bass, Andrew H. Professor of Neurobiology and Behavior



Booker, Ronald Associate Professor



Bradbury, Jack W. Robert G. Engel Professor



Kotlikoff, Michael I. Austin O. Hooey Dean, College of Veterinary Medicine

Lin, David Assistant Professor of Neurobiology



Lindau, Manfred Professor

Professor



Linster, Christiane Associate Professor

Faculty Spotlight



Andrew H. Bass Professor of Neurobiology and Behavior

Search Cornel

Research Focus:

Research in our laboratory focuses on two projects concerning the central and peripheral nervous systems of sound-producing/"vocalizing" teleost fishes: (1) Characterization, and hormonal Influences on, sex differences in the morphology of single, physiologically-identified neurons. (2) Temporal and spectral encoding of acoustic communication signals. These projects revolve around studies of alternative mating tactics in species wth two male morphs that differ in a large sulte of behavioral, neurobiological and neuroendocrine characters including divergent acoustic courtship behaviors and vocal control pathways. We answer questions regarding the existence of behaviors and their underlying mechanisms using a multidisciplinary, neuroethological approach that combines field studies of vocal communication with laboratory studies of the nervous system that utilize one or more of the following approaches: neurophysiology combined with anatomical tract tracing, neuroendocrinology, electron microscopy, Immunocytochemistry, and in situ hybridization.

Departments

Where faculty members in this field work

- Applied and Engineering Physics (A&EP)
- Biomedical Sciences (VTBMS)
- Ecology and Evolutionary Biology (EEB)

New Adopters

 University of Florida

 Kansas State University

 University of Melbourne



VIVO's flexible and open-ended data model will allow:

- Researchers to find facilities, equipment, and collaborators;
- Students to find courses based on how their interests overlap those of faculty
- Visitors unfamiliar with Cornell to navigate to a Web page of interest and understand its context without having to first unravel college and department structures -- whether starting from Google, the Cornell search engine, or VIVO itself.
- Cornell to bring together the biologists, the physicists, the chemists, the computational scientists, etc. in order to create a virtual community.



Agents of Integration



Gottfried Leibniz (1646-1716) 17th Century German philosopher,

mathematician and librarian

Believed that scientific progress depends on the ease of communication between scholars & that the role of the library was to keep open the channels of communication.

We are living in an extraordinary time:

"Our knowledge about life on Earth is growing rapidly through advances in scientific disciplines ranging from microbiology to paleontology, from geology to astrobiology.

The integration of that knowledge is increasing our understanding about the interconnected nature of life..."

Lanting, Frans. *LIFE: A Journey Through Time*. TASCHEN, 2006





To learn more about VIVO, see:

vivo.cornell.edu

"VIVO: Connecting people, creating a virtual life sciences community." Medha Devare, Jon Corson-Rikert et al. *D-Lib Magazine* (July-August 2007): 1-18.

"VIVO: Case Study of an Ontology-Based Web Site." Brian Lowe, Jon Corson-Rikert, and Medha Devare. Technical Report FS-06-06, Semantic Web for Collaborative Knowledge Acquisition: papers from the AAAI Fall Symposium, 106-107, AAAI Press, 2006.

"VIVO Development Roadmap: Enhancing an Ontology-Based University Research Portal with OWL and Rules" <u>http://sunsite.informatik.rwth-aachen.de/Publications/CEUR-WS/Vol-258/paper05.pdf</u>, Proceedings of the OWLED 2007 Workshop on OWL: Experiences and Directions 2007 Innsbruck, Austria June 6-7, 2007.

Cornell's New Life Sciences Initiative: <u>http://www.lifesciences.cornell.edu</u>

To try Vitro for your own application: vitro.mannlib.cornell.edu

Additional Applications

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The remaining slides are leftovers (in case you wonder where they went)