

# Seamless Astronomy

Alyssa A. Goodman

Harvard-Smithsonian Center for Astrophysics

The image shows a screenshot of the WorldWide Telescope application. The interface includes a search bar at the top with the Bing logo. Below the search bar, the location is set to "World > United States > Massachusetts > Suffolk > Boston > Fenway 236 Longwood Ave (approximate)". The main view displays a night sky with red constellation lines and blue star markers overlaid on a street view of a building. A date/time overlay shows "2010 December, 7 00:10". A small inset map in the top right corner shows the location near Harvard Medical School. The left sidebar contains a "Collections" menu with options: Constellations, Solar System (Sky), All-Sky Surveys, Spitzer Studies, and Chandra Studies. The bottom of the interface has navigation and utility icons, including a globe, a magnifying glass, and a question mark. The text "powered by worldwidetelescope.org" is visible at the bottom left.

with

Alberto Accomazzi, Douglas Burke, Gus Muench, Michael Kurtz & Alberto Pepe (Harvard-Smithsonian CfA); Eli Bressert (U. Exeter); Tim Clark (Massachusetts General Hospital/Harvard Medical School); Chris Borgman (UCLA); Jonathan Fay & Curtis Wong (Microsoft Research)

# “Standard” Practices in Bioinformatics?

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www.nih.gov

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Include the PMCID at the end of the full citation.

**Latest News**

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**What should I do?**

Journal Search

GenBank

PubMed Central

NCBI **GenBank Overview** Growth of GenBank

PubMed Entrez BLAST OMIM Books Taxonomy Structure

Search Entrez for

1e+11  
1e+10  
1e+09  
1e+08  
1e+07  
1e+06  
100000  
10000

**What is GenBank?**

GenBank<sup>®</sup> is the NIH genetic sequence database, an annotated collection of all publicly available DNA sequences ([Nucleic Acids Research, 2008 Jan;36\(Database issue\):D25-30](#)). There are approximately 106,533,156,756 bases in 108,431,692 sequence records in the traditional GenBank divisions and 148,165,117,763 bases in 48,443,067 sequence records in the WGS division as of August 2009.

The complete [release notes](#) for the current version of GenBank are available on the NCBI ftp site. A new release is made every two months. GenBank is part of the [International Nucleotide Sequence Database Collaboration](#), which comprises the DNA DataBank of Japan (DDBJ), the European Molecular Biology Laboratory (EMBL), and GenBank at NCBI. These three organizations exchange data on a daily basis.

An example of a GenBank [record](#) may be viewed for a *Saccharomyces cerevisiae* gene.

**In The News: 2009 H1N1 Flu Virus (Swine Flu)**

The Centers for Disease Control and Prevention and other health officials are actively tracking the recent emergence of human cases of swine influenza A (H1N1) virus infection. Influenza A virus sequences from patients affected by this strain are being submitted to GenBank and can be accessed through the [NCBI Flu Resource](#).

01/82 01/85 01/88 01/91 01/94 01/97 01/00 01/03 01/06 01/09

date (mm/yy)

base pairs

1982

2009

# “Standard” Practices in Bioinformatics?

U.S. Department of Health & Human Services  
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### Latest News

- My NCBI My Bibliography tool will pre-screen your citations for NIH Public Access Policy compliance. Find out how!

What should I do?

“Data”

NCBI  
GenBank Overview

PubMed Entrez BLAST OMIM Books Taxonomy Structure

Search Entrez for [ ] Go

### NCBI Home

- NCBI Site Map
- Submit to GenBank
- Submit an update
- Search GenBank
- GenBank and RefSeq: a comparison
- BLAST

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“Literature”

(+ "Other")

Journal of Visualized Experiments

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 pel-freez  
**Depletion of Specific Cell Populations by Complement Depletion**

 Berthold  
**Antibody Profiling by Luciferase Immunoprecipitation Systems (LIPS)**

**What is JoVE?**  
Journal of Visualized Experiments (JoVE) is a video journal for biological research.

**Sections**

All

JoVE

JoVE Neuroscience

JoVE Immunology & Infection

JoVE Clinical and Translational Medicine

JoVE Bioengineering

JoVE Basic Protocols

**Keywords**

Medicine

Neuroscience

Developmental Biology

Cellular Biology


Plant Biology


Microbiology


Immunology





Basic Protocols

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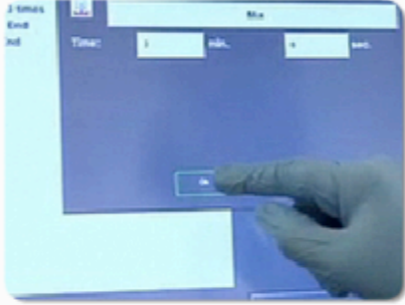
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 [twitter.com/JoVEJournal](#)

 [BOOKMARK](#)    ...

12/06/2010

**Bioenergetic Profile Experiment using C2C12 Myoblast Cells**  
David G. Nicholls<sup>1</sup>, Victor M. Darley-Usmar<sup>2</sup>, Min Wu<sup>3</sup>, Per Bo Jensen<sup>3</sup>, George W. Rogers<sup>3</sup>, David A. Ferrick<sup>3</sup>  
<sup>1</sup>Buck Institute for Age Research, Novato, CA, <sup>2</sup>Department of Pathology, Center for Free Radical Biology, University of Alabama at Birmingham - UAB, <sup>3</sup>Seahorse Bioscience, North Billerica, MA




A description of a method for profiling mitochondrial function in cells is provided. The mitochondrial profile generated provides four parameters of mitochondrial function that can be measured in one experiment: basal respiration rate, ATP-linked respiration, proton leak, and reserve capacity.

[View >>](#)

12/05/2010

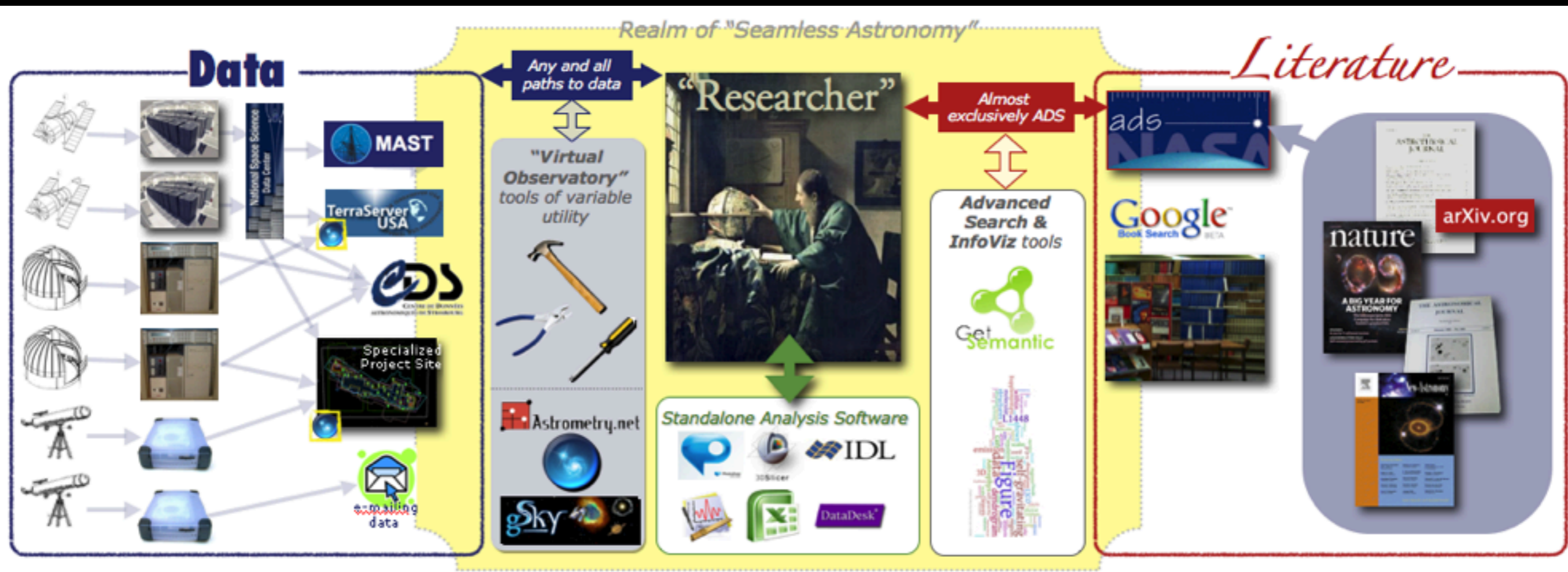
**Non-invasive Imaging of Leukocyte Homing and Migration *in vivo***  
Baomei Wang<sup>1</sup>, Bernd H. Zinselmeyer<sup>2, 1</sup>, Jeremiah R. McDole<sup>1</sup>, Peggy A. Gieselman<sup>1</sup>, Mark J. Miller<sup>1</sup>  
<sup>1</sup>Department of Pathology and Immunology, Washington University in St. Louis, <sup>2</sup>National Institute of Neurological Disorders and Stroke, NINDS, NIH - National Institute of Health



Here, we describe a non-invasive two-photon (2P) microscopy approach to study leukocyte homing in the mouse footpad. We discuss the technical aspects of our tissue imaging preparation and walk the reader through a typical experiment from initial set up to execution and data collection.

[View >>](#)

# Realm of Seamless Astronomy

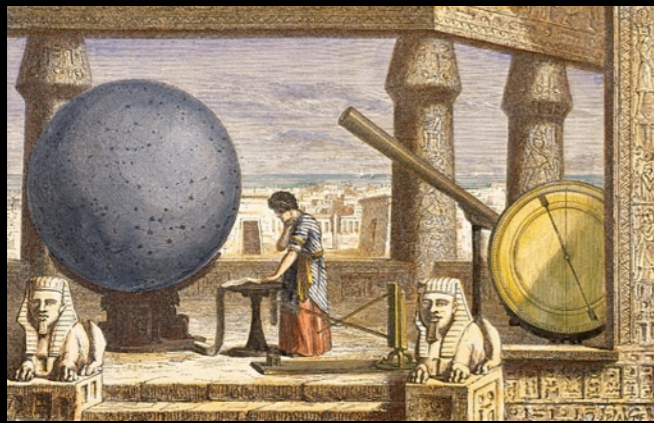


# 3500 years of Observing

Stonehenge, 1500 BC



Ptolemy in Alexandria, 100 AD



Observatory Tower, Lincolnshire, UK, c. 1300



Galileo, 1600



The "Scientific Revolution"

Reber's Radio Telescope, 1937



NASA/Explorer 7  
(Space-based  
Observing)  
1959

"The Internet"



Long-distance  
remote-control/  
"robotic"  
telescopes  
1990s

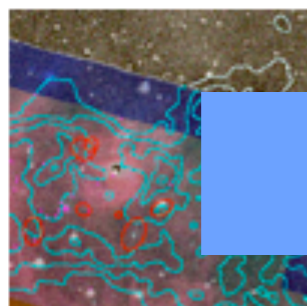


"Virtual  
Observatories"  
21st century

# What can today's Astronomer's "Research" look like?

## Research

In my *Astronomy* research, I am primarily interested in how the gas in galaxies constantly re-arranges itself over huge time spans to constantly form new stars. I have also had a long-standing interest in data *visualization*, and in improving the use of *computers* in all aspects of scientific research. I teach a course at Harvard called "The Art of Numbers," and I am very involved in the WorldWide Telescope Project, which brings astronomical data to everyone through an interface that demonstrates data delivery for the 21st Century of "e-Science."



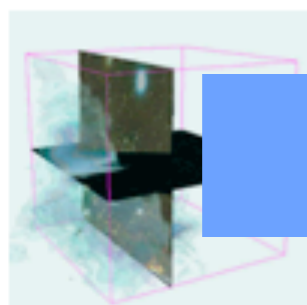
COMPLETE  
The COordinated Molecular Probe

Data



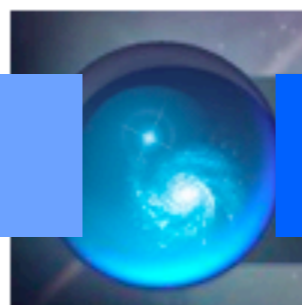
Star Formation Taste Tests  
A community of theorists, numericists, and

Simulation



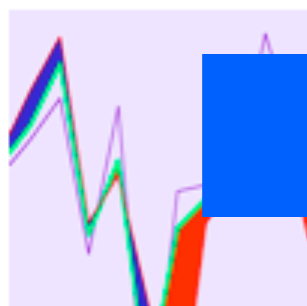
Astronomical Medicine  
Exploiting the intersection of

Publishing



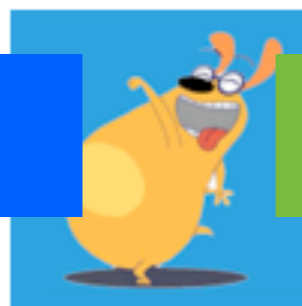
WorldWide Telescope  
A beautiful portal to all of Astronomy for

e-Science Tools



Visualization

Viz



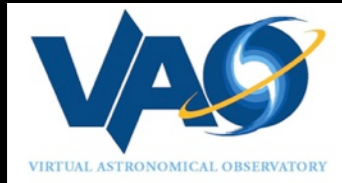
Science for Everyone

Outreach

# Publishing

# Data

# Simulation



# WorldWide Telescope

# e-Science Tools

# Viz

**WorldWide Telescope Ambassadors Program**  
<http://www.cfa.harvard.edu/WWTAmbassadors/>

**Harvard University, WGBH & Microsoft Research**  
 Alyssa Goodman, Patricia Udomprasert, Annie Valva & Curtis Wong

**What is WorldWide Telescope and its Ambassadors Program?**  
 WorldWide Telescope (WWT) is a fantastic "Universe Information System" created primarily by Curtis Wong and Jonathan Ray at Microsoft Research. It functions as a Virtual Astrophysical Observatory linking its users to much of the world's store of online data and information about our Universe. WWT is evolving to become a key research tool within the online astronomy ecosystem known in the US presently as the "VO" (see A. Goodman's "Spacetime Astronomy" talk at this meeting), but it also offers unprecedented new opportunities for STEM outreach.

The **WorldWide Telescope Ambassadors Program** promotes WWT as a future-learning way to teach and learn STEM concepts by recruiting astronomically-literate volunteers who are trained to be experts in using WWT as a teaching tool.

**Who are we?**  
 Our current collaboration brings together professional astronomers and science educators at Harvard, computational virtuosos at MS Research, and STEM education and outreach specialists at WGBH. The next phase of the project (see table below) will include participants from selected areas within the US, including Washington, Florida, Arizona, Alaska, and Appalachia.

**Who are the WWT Ambassadors, and what do they do?**  
 WWT Ambassadors are carefully recruited for training from amongst: 1) retired STEM professionals and amateur astronomers with a demonstrable deep knowledge of astronomy and physics; 2) undergraduate and graduate students and postdoctoral fellows in Astronomy and Physics; and 3) science teachers. In their training, Ambassadors learn how to use WWT's tools in general, and also how to create and publish guided "tours" of astrophysical concepts. These Tours allow users to display beautiful astronomical images in their proper context in the night sky, while demonstrating the physical principles at work in those images. Ambassadors can create and use materials within WWT: give volunteer presentations at variety of public venues; help out in classroom settings; or choose to do more than one of the above!

**What have we done so far?**  
 Our program began in the Fall of 2009. Initial Ambassadors are currently working with 80 middle school students and their teacher, Michelle Bartley, at the Clarke Middle School in Lexington, MA, helping the students to prepare tours within WWT based on a six-week-long research experience. WWT and its Ambassadors have generated tremendous enthusiasm from the students, and have inspired quality learning through exploration and discovery. Results from the Pilot at Clarke are being collected online through a dedicated commenting site open to all students, and an analysis of the Pilot experience will serve to inform the NSF proposal being submitted to expand the program in the Spring of 2010.

**What's the whole plan, and what are the program's goals?**  
 We are presently preparing a proposal to the National Science Foundation, based in large part on our "Pilot" experience, to implement "Phase I" of the Ambassadors Project (see table), where we will begin a limited expansion within the US, carefully selecting cities and partners where we will be able to maximize success with the available resources, while increasing the socioeconomic diversity of our sites. We plan to expand nationally in Phase II, and internationally in Phase III. With minimal advertising, we have already received inquiries from dozens of interested and qualified potential volunteers in multiple states and countries.

A critical goal of this project is to create a **full astronomy curriculum using WWT Tours created by our Ambassadors**. These Tours will be vetted by the astronomy and science education professionals within our collaboration, and they will be freely available, centrally managed, and searchable, through web services at WWT. The entire WWT Ambassadors "tour Curriculum" will be integrated with **WGBH Teachers' Domain**, which currently has nearly 400,000 registered users.

WorldWide Telescope can help change how students learn science by demonstrating the joys of inquiry and discovery, and the WWT Ambassadors Program is designed to help to increase science literacy in the general public while forming intergenerational connections within their communities.

Phase	Scope	Timeline
Pilot	Boston Area	Fall 2009-Spring 2010
Phase I	Limited US Expansion	Fall 2010-Summer 2011
Phase II	US-wide	Fall 2011-Summer 2012
Phase III	International	2012+

Microsoft Research | VАО | WGBH | External Research | Microsoft Research





# WorldWide Telescope: a UIS from Microsoft Research [UIS=Universe Information System]



Seamless *Data/Literature Connections* (e.g. ADS)

“*Modular Craftsmanship*” (e.g. flickr)

*Collections, Communities & Guided Tours*

**The World Wide Telescope  
an Archetype for Online-Science**

Jim Gray (Microsoft)

Alex Szalay (Johns Hopkins University)

Microsoft Academic Days in Silicon Valley

<http://research.microsoft.com/~gray/talks>

*Created by Curtis Wong and Jonathan Fay at MSR; AG is “Academic Partner” on the WWT Project*

# The (US) Backstory

2001 ..... 2008 (2010)

Science News  
\$10 Million N  
ScienceDaily (O  
its users the worl  
research instituti  
starting an ambiti  
universe online.



... the Universe at your fingertips

National Science Foundation  
WHERE DISCOVERIES ARE MADE

FUNDING | AWARDS



VIRTUAL ASTRONOMICAL OBSERVATORY

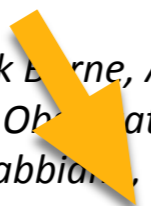
SEARCH  
NSF Web Site

ICS | ABOUT

Print

See Also: (NVO), headed by astronomer Alex

NVO senior personnel:  
Charles Alcock, University of Pennsylvania Kirk Borne, Astro  
Tim Cornwell, NSF National Radio Astronomy Observatory  
Optical Astronomy Observatory Giuseppina Fabbiano, Smit  
Observatory Alyssa Goodman, [Harvard University](#) Jim Gray  
Hanisch, Space Telescope Science Institute George Helou, N  
Analysis Center Stephen Kent, Fermilab Carl Kesselman, [Un](#)  
Miron Livny, University of Wisconsin, Madison Carol Lonsdo  
and Analysis Center Tom McGlynn, GSFC/HEASARC/USRA A  
University Reagan Moore, San Diego Supercomputer Cente  
Naval Observatory, Flagstaff Station Ray Plante, [University](#)  
Thomas Prince, California Institute of Technology Ethan Sch  
STScI Nicholas White, NASA Goddard Space [Flight Center](#) R  
of Technology



1 2 4

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Upcoming Due Dates

Advanced Funding Search

How to Prepare Your Proposal

About Funding

Proposals and Awards

Proposal and Award Policies and Procedures Guide

Introduction

Proposal Preparation and

## Management and Operation of the Virtual Astronomical Observatory



CONTACTS

Name	Email
Nigel Sharp	<a href="mailto:nsharp@nsf.gov">nsharp@nsf.gov</a>
Eileen D. Friel	<a href="mailto:efriel@nsf.gov">efriel@nsf.gov</a>

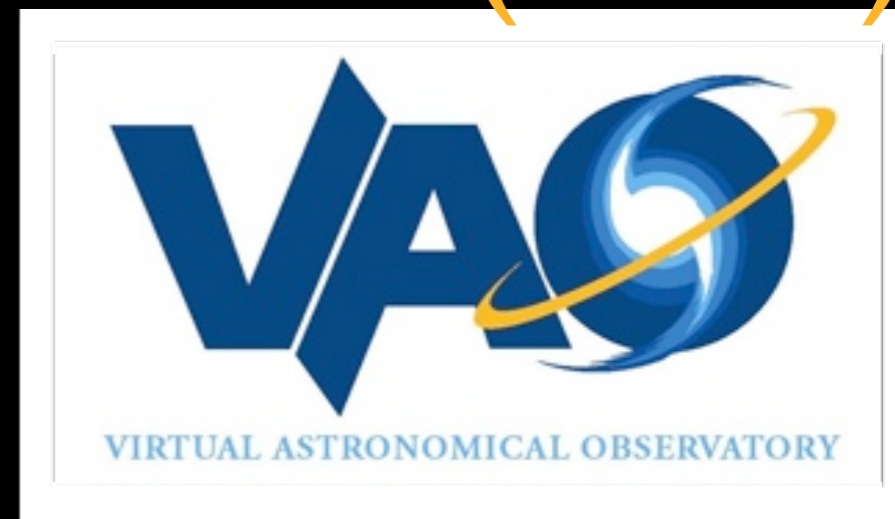
PROGRAM GUIDELINES

Solicitation [08-537](#)

Please be advised that the NSF Proposal & Award Policies & Procedures (PAPPG) includes revised guidelines to implement the mentoring pro  
the America COMPETES Act (ACA) (Pub. L. No. 110-69, Aug. 9, 2007.)  
specified in the ACA, each proposal that requests funding to support  
postdoctoral researchers must include a description of the mentoring  
that will be provided for such individuals. Proposals that do not comp  
this requirement will be returned without review (see the PAPP Guide  
Grant Proposal Guide Chapter II for further information about the  
implementation of this new requirement).



2001 ..... 2008 (2010)



and meanwhile...



Welcome to the New NVO Home Page! We welcome your [feedback](#) on the new site.

Discover, retrieve, and analyze astronomical data from archives and data centers around the world.

- [Need help? Not sure how to start? >> Getting Started with NVO](#)
- [Collect all data at a given position. >> DataScope](#)
- [Count matches between catalog entries and given positions. >> Inventory](#)
- [Query databases and cross-match object lists >> Open SkyQuery](#)
- [Find data collections and catalogs by searching their descriptions. >> Directory](#)
- [Integrate data from multiple positions and datasets. >> VIM](#)
- [Query the VO from the command line. >> VO-CLI](#)
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**AstroGrid** Virtual Observatory Software for Astronomers

HOME INSTALL HELP SUPPORT

## Welcome to AstroGrid

AstroGrid is the doorway to the Virtual Observatory (VO). We provide a suite of de... enable astronomers to explore and bookmark resources from around the world, find in VOSpace, query databases, plot and manipulate tables, cross-match catalogues, an... to automate sequences of tasks. Tools from other Euro-VO projects inter-operate with...



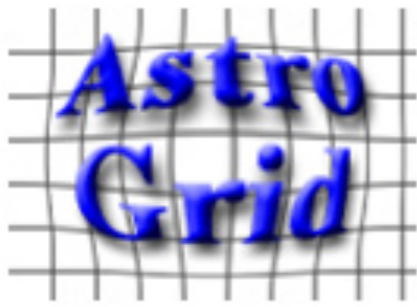
**The Aladin Sky Atlas**

[Download Aladin on your machine](#) [Start Aladin applet \(Fr - US - It - In - UK - Ca\)](#) [Jump to Aladin previewer](#) [français](#)

**New: Aladin release 6 - April 2009**  
Measurement browser by interactive histogram, Outreach mode, Full screen, SAMP compatible, RICE compression support, etc...

**New: The Aladin manual - April 2009 - The full user manual in English and French...**

**Description** Aladin is an interactive software sky atlas allowing the user to visualize digitized astronomical images, superimpose entries from astronomical catalogues or databases, and interactively access related data and information from the *Simbad* database, the *VizieR* service and other archives for all known sources in the field ([see available data](#)). Created in 1999, Aladin has become a widely-used VO portal capable of addressing challenges such as locating data of interest, accessing and exploring distributed datasets, visualizing multi-wavelength data. Compliance with existing or emerging VO standards, interconnection with other visualisation or analysis tools, ability to easily compare heterogeneous data are key topics allowing Aladin to be a powerful data exploration and integration tool as well as a science enabler. The *Aladin sky atlas* is available in three modes: a Java Standalone application, a Java applet interface and a simple previewer.



~~The~~ VO

# What/where are/is “Data”?

COMPLETE Data Coverage Tool

http://www.worldwidetelescope.org/COMPLETE/WWTCoverageTool.html#

newKodak EXPLO Bing WWTSL Alyssa Good... Home Page Toolfida Harvard IC Projects Wikis Etc. Google Calendar \$\$\$ Image Search FbK share Directories ADS Best RSS (3387) BeyondADS

**Finder Scope**

**Classification:**  
Reflection Nebula in Perseus

**NGC 1333**

RA: 03h29m20s Magnitude: n/a  
 Dec: 31 : 24 : 57 Distance: n/a  
 Alt: -09 : 53 : 42 Rise: 17:16  
 Az: 29 : 51 : 24 Transit: 01:32  
 Set: 09:48

Image Credits:  
Copyright DSS Consortium

<http://www.gssc.stsci.edu/acknowledgements/>

Research Show Object Close

### COMPLETE Data Available

Center on Perseus Center on Ophiuchus Center on Serpens

Full-Cloud Data (Phase I, All Data Available)

Dataset	Show	Perseus	Ophiuchus	Serpens	Link
GBT: HI Data Cube	<input type="checkbox"/>	✓	✓	⊘	Data
IRAS: Av/Temp Maps	<input type="checkbox"/>	✓	✓	✓	Data
FCRAO: 12CO	<input type="checkbox"/>	✓	✓	✓	Data
FCRAO: 13CO	<input type="checkbox"/>	✓	✓	✓	Data
JCMT: 850 microns	<input type="checkbox"/>	✓	✓	⊘	Data
Spitzer c2d: IRAC 1,3 (3.6,5.8 μm)	<input type="checkbox"/>	✓	✓	✓	Data
Spitzer c2d: IRAC 2,4 (4.5,8 μm)	<input type="checkbox"/>	✓	✓	✓	Data
CSO/Bolocam: 1.2-mm	<input type="checkbox"/>	✓	⊘	⊘	Data
Spitzer MIPS: Derived Dust Map	<input type="checkbox"/>	✓	⊘	⊘	Data

Targeted Regions (Phase II, Some Data Not Yet Available)

CTIO/Calar Alto: NIR (J,H,K <sub>s</sub> )	<input type="checkbox"/>	✓	✓	⊘	Data
IRAM 30-m: N2H+ and C18O	<input type="checkbox"/>	✓	⊘	⊘	Data
IRAM 30-m: 1.1-mm continuum	<input type="checkbox"/>	✓	⊘	⊘	Data
Megacam/MMT: r,i,z images	<input type="checkbox"/>	✓	⊘	⊘	Data

Catalogs & Pointed Surveys

NH3 Pointed Survey	<input type="checkbox"/>	✓	⊘	⊘	Data
YSO Candidate list (c2d)	<input type="checkbox"/>	✓	✓	✓	Data

# What/where is literature?

Object Query Results

http://adsabs.harvard.edu/cgi-bin/abs\_connect?db\_key=AST&sim\_query=YES&object=NGC%207

agoodman@cfa.harvard.edu | [my Account](#) | [Sign off](#)

## SAO/NASA Astrophysics Data System (ADS)

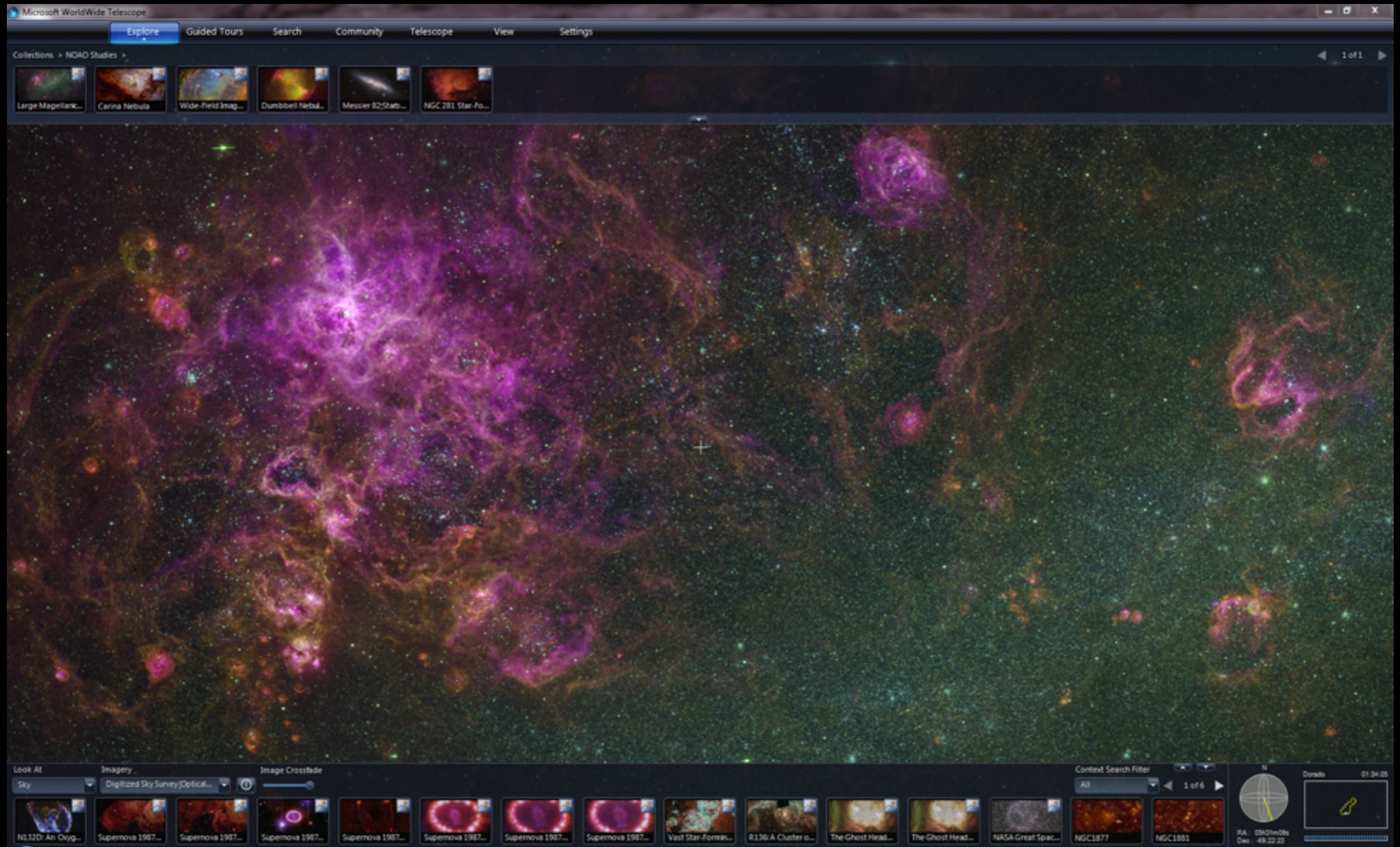
### Query Results from the Astronomy Database

Retrieved 200 abstracts, starting with number 1. Total number selected: 393.

Sort options

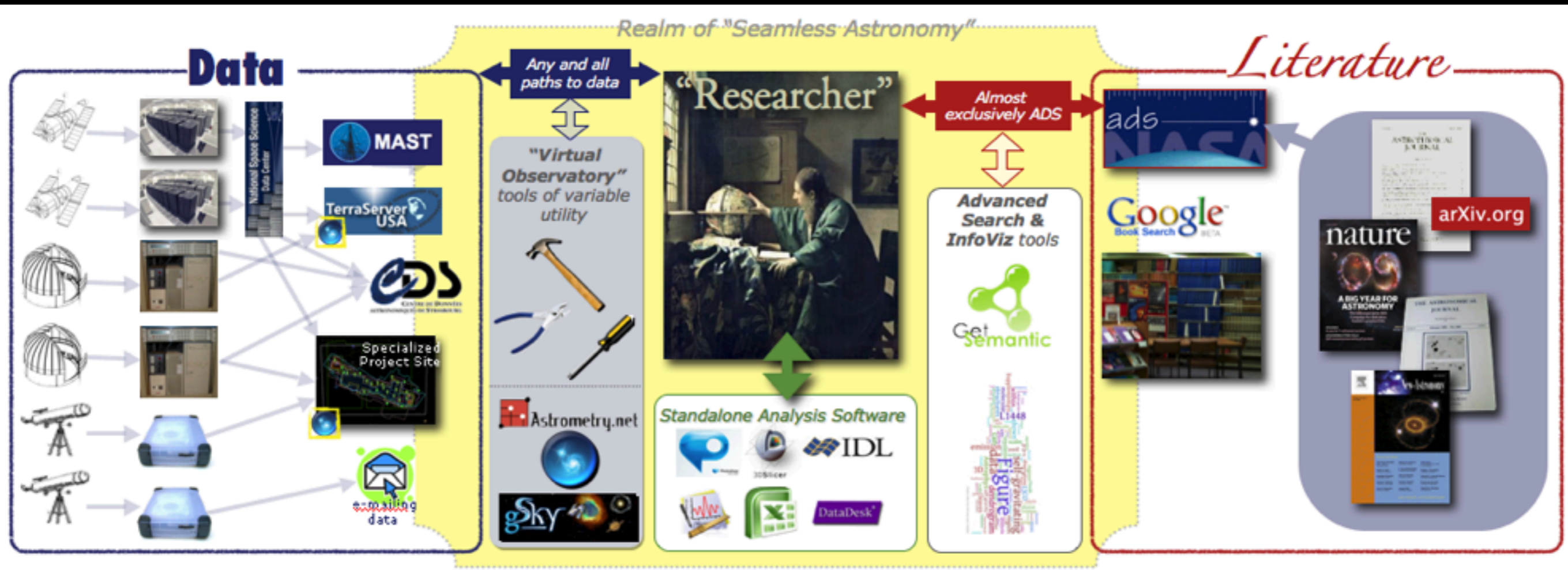
#	Bibcode Authors	Score	Date	List of Links Access Control Help
1	<a href="#">2009ApJ...700.1609M</a> Myers, Philip C.	1.000	08/2009	<a href="#">A</a> <a href="#">Z</a> <a href="#">E</a> <a href="#">F</a> <a href="#">L</a> <a href="#">X</a> <a href="#">R</a> <a href="#">C</a> <a href="#">S</a> <a href="#">U</a>
2	<a href="#">2009ApJ...700.1190D</a> Desai, Vandana; Soifer, B. T.; Dey, Arjun; LeFloc'h, Emeric; Armus, Lee; Brand, Kate; Brown, Michael J. I.; Brodwin, Mark; Jannuzi, Buell T.; Houck, James R.; and 8 coauthors	1.000	08/2009	<a href="#">A</a> <a href="#">Z</a> <a href="#">E</a> <a href="#">F</a> <a href="#">L</a> <a href="#">X</a> <a href="#">R</a> <a href="#">C</a> <a href="#">S</a> <a href="#">U</a>
3	<a href="#">2009MNRAS.396.1851N</a> Nutter, D.; Stamatellos, D.; Ward- Thompson, D.	1.000	07/2009	<a href="#">A</a> <a href="#">Z</a> <a href="#">E</a> <a href="#">F</a> <a href="#">L</a> <a href="#">X</a> <a href="#">R</a> <a href="#">S</a> <a href="#">U</a>
4	<a href="#">2009A&amp;A...502..175B</a> Boersma, C.; Peeters, E.; Martín- Hernández, N. L.; van der Wolk, G.; Verhoeff, A. P.; Tielens, A. G. G. M.; Waters, L. B. F. M.; Pel, J. W.	1.000	07/2009	<a href="#">A</a> <a href="#">Z</a> <a href="#">E</a> <a href="#">F</a> <a href="#">L</a> <a href="#">R</a> <a href="#">S</a> <a href="#">U</a>
5	<a href="#">2009MNRAS.395.1695H</a> Hernán-Caballero, A.; Pérez-Fourmon, I.; Hatziminaoglou, E.; Afonso-Luis, A.; Rowan-Robinson, M.; Rigopoulou, D.; Farrah, D.; Lonsdale, C. J.; Babbedge, T.;	1.000	05/2009	<a href="#">A</a> <a href="#">Z</a> <a href="#">E</a> <a href="#">F</a> <a href="#">L</a> <a href="#">X</a> <a href="#">R</a> <a href="#">C</a> <a href="#">S</a> <a href="#">U</a>

# What is a Virtual Observatory?





# Seamless Astronomy



*But, that was 2009...*

Realm of "Seamless Astronomy"

Data



2010  
Evermore  
Seamless  
Astronomy

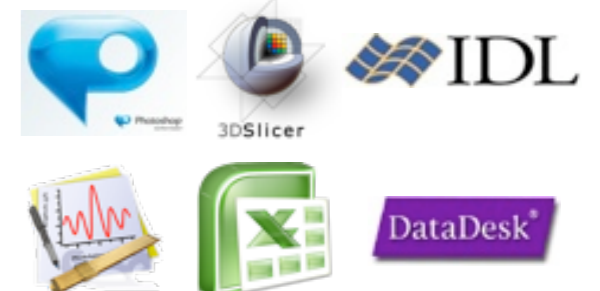
Advanced  
Search &  
InfoViz tools



Literature



Standalone Analysis Software



This simple argument, first made at the 2009 WWT session at AAS, seems to be working:

*“Astronomy research tools should work as seamlessly as travel research tools.”*

# “Astronomy research tools should work as seamlessly as travel research tools.”

When the concept of a "**Virtual Observatory**" (**VO**) was first discussed by future-looking astronomers in the mid-1990s, all thoughts were about **distributed data** and a **common system** to access it. But, information access on today's web primarily works in the **reverse**: **distributed tools** accessing **common data centers**. Capability and ease-of-use improvements to the web typically now come in the form of **nesting, aggregating or connecting tools**. Think **kayak.com**, iGoogle, or Bing Maps. In the "Seamless Astronomy" view to be discussed, today's "VO" should be thought of as the **ever-improving set of data archives, tools, interconnections**, and **standards** that strive to make astronomical research as "seamless" as travel research. The good news is that the cutting-edge of the astronomical research environment is moving rapidly in this seamless direction. The most savvy institutions are beginning to realize that the original VO model of data distributed on thousands of individual researchers' desktop hard drives is not a sustainable model, and that they need to offer **data hosting, archiving, and stewardship** services the way libraries offer such services for printed matter. **Software tools** are becoming much more **interoperable** thanks to protocols for message-passing such as "**SAMP**." And, the improved speed of **web applications** is to some extent removing platform-dependence as an obstacle to programmers and users alike. The bad news is that **most astronomers are largely unaware** of the tools that this new nirvana offers, and instead still conduct online research in the same way they did a decade ago. In this talk, I will focus in particular on how our recent work on connecting Microsoft's **WorldWide Telescope** program to other commonly-used astronomical research tools--most notably literature searching tools--has made the astronomical research environment more seamless. More generally, I will emphasize and demonstrate that an **ever-increasing diversity of tools** allow researchers to carry out a particular research task, so that the **important research** for the future lies in figuring out **how to make the tools, their interconnections, and their connections to data and literature resources useful and well-known to the astronomical community**.

From: Abstract Service <ads@cfa.harvard.edu>  
 Subject: myADS Notification (Astronomy database)  
 Date: March 23, 2010 12:19:23 AM EDT  
 To: Alyssa Goodman



myADS Personal Notification Service  
 for Alyssa Goodman  
 Tue Mar 23 00:19:23 2010  
 Astronomy database

- ADS Main Queries**
- [Astronomy](#) **GOODMAN, ALYSSA - Citations: 3310 (total 4002)**
  - [Physics](#) **2010NewA...15..444K: Karatas,+:** New intrinsic-colour calibration for uvby-beta photometry
  - [arXiv e-prints](#) **2010MNRAS.403.1054D: Dabringhausen,+:** Mass loss and expansion of ultra-compact dwarf galaxies through gas expulsion
  - [FAQ](#) **2010ApJ...713..269F: Federrath,+:** Collapse and Accretion in Turbulent Clouds: Implementation and Comparison
  - [What's new](#) **2010ApJ...712.1403P: Pech,+:** Cloud Sink Particles in AMR and SPH
- Current Tables of Contents**
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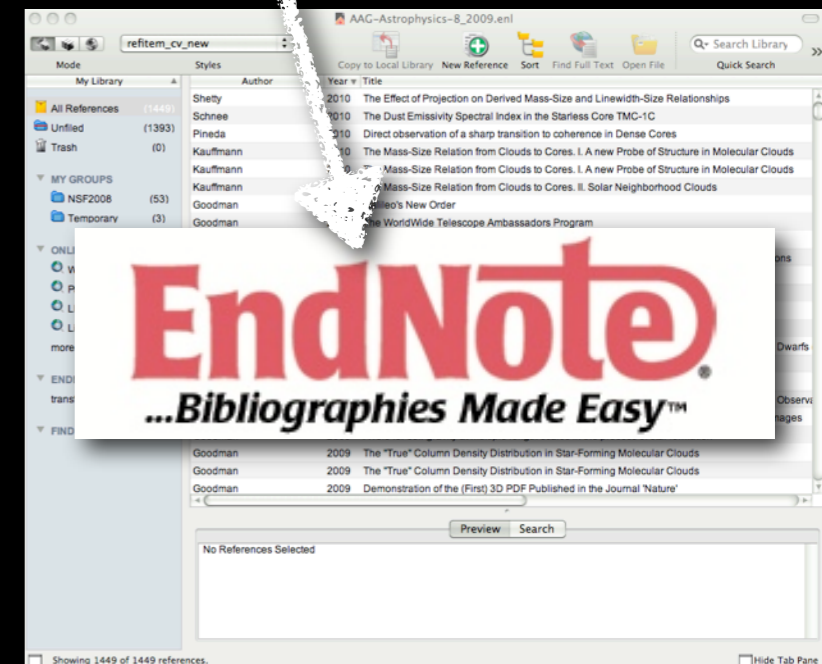
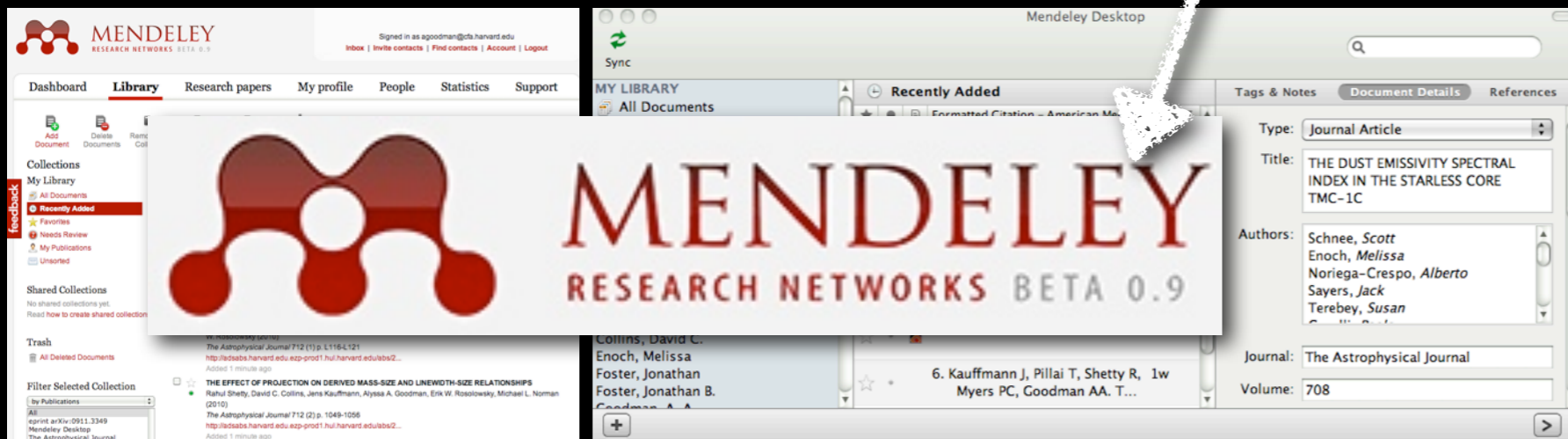
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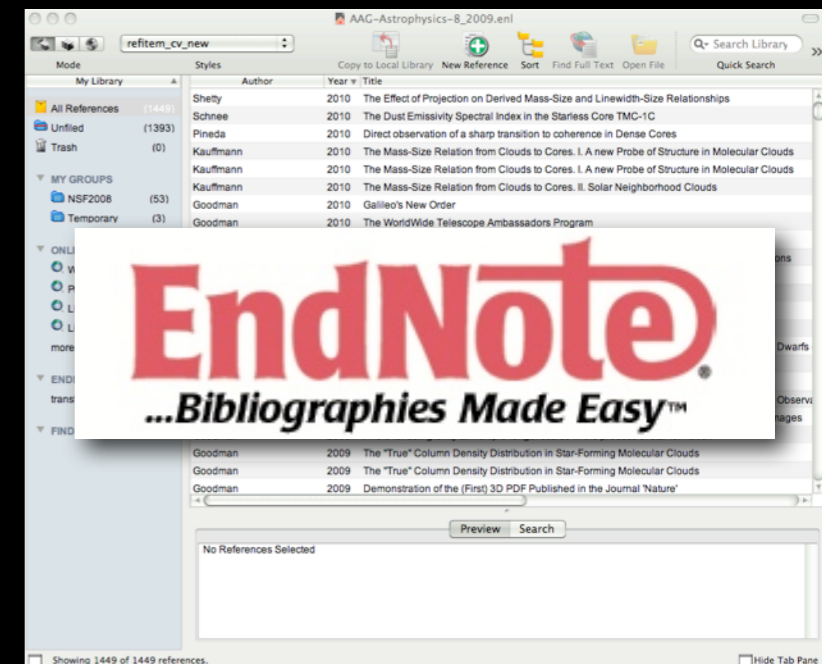
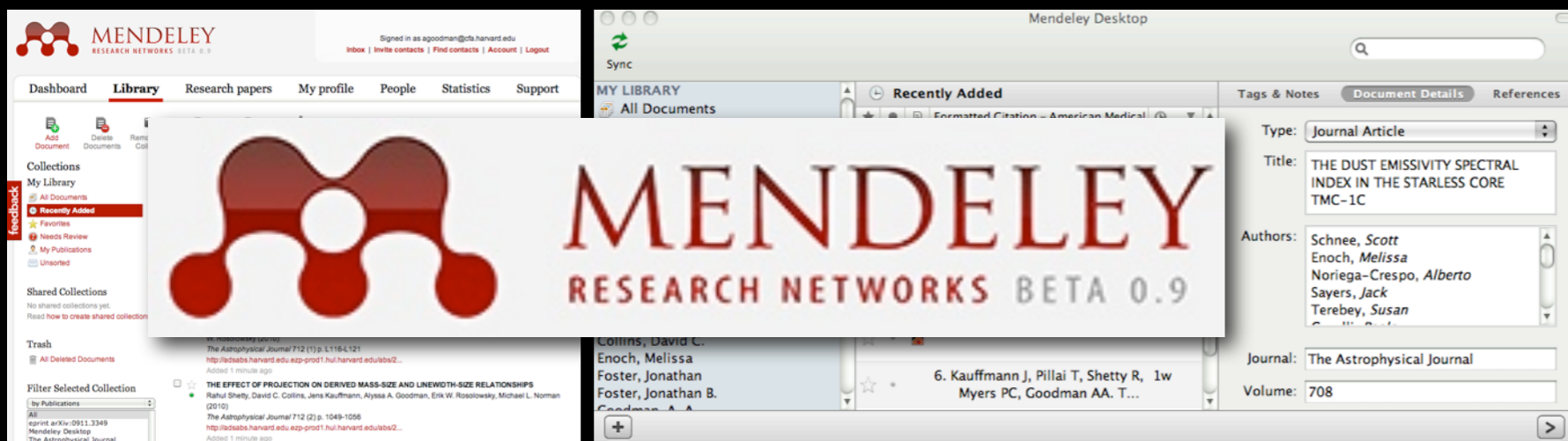
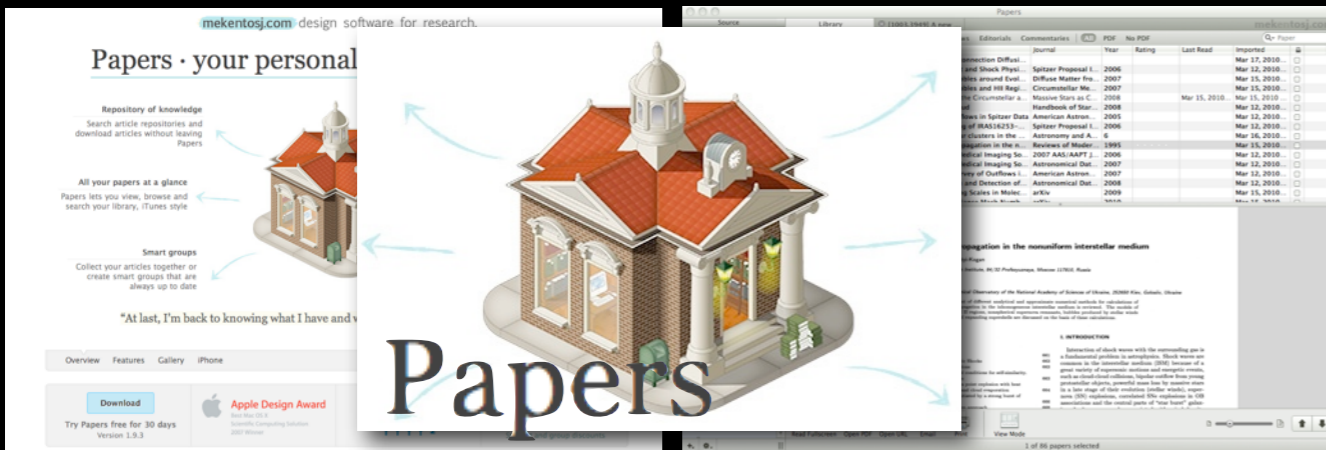
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Astronomers  
 can see  
 parallels...

# Literature Handling: *Diverse Apps, Common Data*



# What fraction of astronomy researchers know about these tools?



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beta

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Please enter a list of authors whose publications are particularly relevant for you. They will define a reference region in the network of co-authorship. Experience shows that, on average, satisfactory results are obtained by entering about five names. However, depending on the range of interests, a longer list might be needed (it is usually a good idea to include yourself).

Enter a last name:

Favorite authors

Arxiv	Remove	HEILES_C
<b>Mark R. Krumholz</b>		
KRUMHOLZ_M		
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39 papers

$P=1.14 \times 10^{-2}$   
[34] [arXiv:1003.4900 \[pdf\]](#)

## Star-forming gas in young clusters

[Philip C. Myers](#)

Comments: To appear in Astrophysical Journal, May 2010

Subjects: Galaxy Astrophysics (astro-ph.GA)

Initial conditions for star formation in clusters are estimated for protostars whose masses follow the initial mass function (IMF) from 0.05 to 10 solar masses. Star-forming infall is assumed equally likely to stop at any moment, due to gas dispersal dominated by stellar feedback. For spherical infall, the typical initial condensation must have a steep density gradient, as in low-mass cores, surrounded by a shallower gradient, as in the clumps around cores. These properties match observed column densities in cluster-forming regions when the mean infall stopping time is 0.05 Myr and the accretion efficiency is 0.5. The infall duration increases with final protostar mass, from 0.01 to 0.3 Myr, and the mass accretion rate increases from 3 to  $300 \times 10^{(-6)}$  solar masses/yr. The typical spherical accretion luminosity is  $\sim 5$  solar luminosities, reducing the luminosity problem to a factor  $\sim 3$ . The initial condensation density gradient changes from steep to shallow at radius 0.04 pc, enclosing 0.9 solar masses, with mean column density  $2 \times 10^{(22)} \text{ cm}^{(-2)}$ , and with effective central temperature 16 K. These initial conditions are denser and warmer than those for isolated star formation.

results are



# “writemypaper.org?”

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The Smithsonian/NASA Astrophysics Data System  
ADS-Labs

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Search

polycyclic aromatic hydrocarbons Topic Search

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- Most recent
- Most important

**Subject Area Search:**

- Most popular
- Most useful
- Most instructive

Coming Soon  
(wait a few slides...)  
Full-text-based,  
faceted, semantic,  
topic search...

The ADS is Operated by the Smithsonian Astrophysical Observatory under NASA Grant NNX09AB39G

Explore

Guided Tours

Search

View

Settings

ngc 7023

Plot Results

VO Search

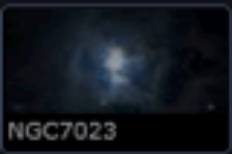
J2000

RA

Dec

Go


1 of 2



# WorldWide Telescope



**Finder Scope**



**Classification:**  
Reflection Nebula  
in Cepheus

**NGC 7023**

RA:	21h01m36s	Magnitude:	n/a
Dec:	68 : 10 : 11	Distance:	n/a
Alt:	30 : 55 : 38	Rise:	Circumpolar
Az:	341 : 36 : 56	Transit:	Circumpolar
		Set:	Circumpolar

**Image Credits:**  
Jack Newton

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Research Show Object Close

Look At

Imagery

Sky

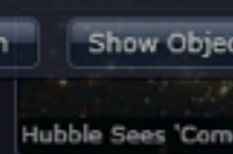
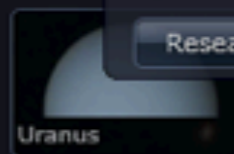
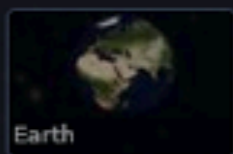
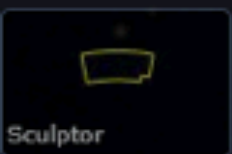
Digitized Sky Survey (Opt)

<http://www.jacknewton.com/>

1 of 23



Cepheus 00:14:04



RA : 21h01m36s  
Dec : 68:10:11

ngc 7023

Plot Results

VO Search

J2000

RA

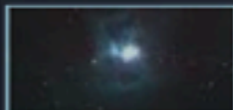
Dec

Go

1 of 2

NGC7023

Finder Scope



Classification:  
Reflection Nebula  
in Cepheus

NGC 7023

RA: 21h01m36s Magnitude: n/a  
Dec: 68 : 10 : 11 Distance: n/a  
Alt: 30 : 53 : 38 Rise: Circumpolar

Az: 341.5 Alt: 30.9 Circumpolar  
Set: 341.5 Circumpolar

- Information
- Imagery
- Virtual Observatory Searches
- Set as Foreground Imagery
- Set as Background Imagery

- Look up on SIMBAD
- Look up on SEDS
- Look up on Wikipedia
- Look up publications on ADS
- Look up on NED
- Look up on SDSS



Look At

Imagery

Sky

Digitized Sky Survey (Opt)

Sculptor

Earth

Uranus

Properties

Copy Shortcut

1 of 23

N

Cepheus

00:1



RA : 21h01m36s  
Dec : 68:10:11

Done

## [SAO/NASA Astrophysics Data System \(ADS\)](#)

### Query Results from the Astronomy Database

[Go to bottom of page](#)

Retrieved **200** abstracts, starting with number **1**. Total number selected: **393**.

Sort options ▾

#	Bibcode Authors	Score	Date	<a href="#">List of Links</a> <a href="#">Access Control Help</a>				
1	<input type="checkbox"/> <a href="#">2009ApJ...700.1609M</a> Myers, Philip C.	1.000	08/2009	<a href="#">A</a> <a href="#">Z</a> <a href="#">E</a> <a href="#">F</a> <a href="#">L</a> <a href="#">X</a>	<a href="#">R</a> <a href="#">C</a>	<a href="#">S</a>	<a href="#">U</a>	
2	<input type="checkbox"/> <a href="#">2009ApJ...700.1190D</a> Desai, Vandana; Soifer, B. T.; Dey, Arjun; LeFloc'h, Emeric; Armus, Lee; Brand, Kate; Brown, Michael J. I.; Brodwin, Mark; Jannuzi, Buell T.; Houck, James R.; <b>and 8</b> <b>coauthors</b>	1.000	08/2009	<a href="#">A</a> <a href="#">Z</a> <a href="#">E</a> <a href="#">F</a> <a href="#">L</a> <a href="#">X</a>	<a href="#">R</a> <a href="#">C</a>	<a href="#">S</a>	<a href="#">U</a>	
3	<input type="checkbox"/> <a href="#">2009MNRAS.396.1851N</a> Nutter, D.; Stamatellos, D.; Ward- Thompson, D.	1.000	07/2009	<a href="#">A</a> <a href="#">Z</a> <a href="#">E</a> <a href="#">F</a> <a href="#">L</a> <a href="#">X</a>	<a href="#">R</a>	<a href="#">S</a>	<a href="#">U</a>	
4	<input type="checkbox"/> <a href="#">2009A&amp;A...502..175B</a> Boersma, C.; Peeters, E.; Martín- Hernández, N. L.; van der Wolk, G.; Verhoeff, A. P.; Tielens, A. G. G. M.; Waters, L. B. F. M.; Pel, J. W.	1.000	07/2009	<a href="#">A</a> <a href="#">Z</a> <a href="#">E</a> <a href="#">F</a> <a href="#">L</a>	<a href="#">R</a>	<a href="#">S</a>	<a href="#">U</a>	
5	<input type="checkbox"/> <a href="#">2009MNRAS.395.1695H</a> Hernán-Caballero, A.; Pérez-Fourmon, I.; Hatziminaoglou, E.; Afonso-Luis, A.; Rowan-Robinson, M.; Rigopoulou, D.; Farrah, D.; Lonsdale, C. J.; Babbedge, T.;	1.000	05/2009	<a href="#">A</a> <a href="#">Z</a> <a href="#">E</a> <a href="#">F</a> <a href="#">L</a> <a href="#">X</a>	<a href="#">R</a> <a href="#">C</a>	<a href="#">S</a>	<a href="#">U</a>	

ngc 7023

Plot Results

VO Search

J2000

RA

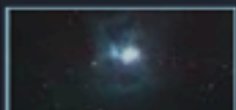
Dec

Go

1 of 2

NGC7023

Finder Scope



Classification: Reflection Nebula in Cepheus

NGC 7023

RA: 21h01m36s Magnitude: n/a  
Dec: 68 : 10 : 11 Distance: n/a  
Alt: 30 : 53 : 38 Rise: Circumpolar

Az: 341.5 Alt: 30.9 Circumpolar  
Set: 10:00:00 Circumpolar

- Name: NGC 7023
- Information
- Imagery
- Virtual Observatory Searches
- Set as Foreground Imagery
- Set as Background Imagery

- Look up on SIMBAD
- Look up on SEDS
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Look At

Imagery

Sky

Digitized Sky Survey (Optical)

Sculptor

Earth

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Properties

Copy Shortcut

1 of 23



RA : 21h01m36s  
Dec : 68:10:11

Cepheus

00:1

Done



## SIMBAD query result

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Object query : NGC 7023

C.D.S. - SIMBAD4 rel 1.132 - 2009.10.23CEST21:59:31

[Available data](#)[Basic data](#)[Identifiers](#)[Plot & images](#)[Bibliography](#)[Measurements](#)[External archives](#)[Notes](#)

## Basic data :

## NGC 7023 -- Open (galactic) Cluster

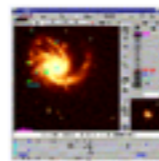
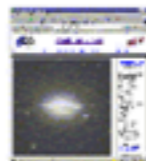
 with radius  arcmin

Other object types: **C1\*** (C,C1,[BDB2003]) ,**OpC** (OCISM) ,**MII** (LBN) ,**V\*** (AAVSO) ,**IR** (IRAS)  
 ICRS coord. (ep=2000): 21 01 36.9 +68 09 48 ( - ) [ - - - ] D -  
 FK5 coord. (ep=2000 eq=2000): 21 01 36.9 +68 09 48 ( - ) [ - - - ] D -  
 104.0616 +14.1926 ( - ) [ - - - ] D -  
 Fluxes (I): **B** 7.20 [-] D -

## Identifiers (11) :

<a href="#">NGC 7023</a>	<a href="#">IRAS 20599+6755</a>	<a href="#">LBN 487</a>	<a href="#">IBDB2003</a> G104.06+14.19
<a href="#">C 2059+679</a>	<a href="#">IRAS F20599+6755</a>	<a href="#">OCISM 50</a>	<a href="#">AAVSO 2044+67</a>
<a href="#">C1 VDB 139</a>	<a href="#">LBN 104.08+14.21</a>	<a href="#">OCl 235</a>	

## Plots and Images

 radius  arcmin


## References (371 between 1983 and 2009)

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Search

polycyclic aromatic hydrocarbons Topic Search

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Subject Area Search:  
 Most popular  
 Most useful  
 Most instructive

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The Smithsonian/NASA Astrophysics Data System  
ADS-Labs

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Most instructive results for the query: polycyclic aromatic hydrocarbons

Object: Other object [X]

FILTER BY:

SIMBAD Objects

- Other object
- ORI BAR (37)
- NGC 2023 (31)
- M 17 (24)
- IC 4553 (19)
- NGC 253 (19)
- NGC 6240 (18)
- NGC 7023 (43)

ADS Publications x

SIMBAD Info

World Wide Telescope

Aladin applet

SIMBAD

H II region

Nebula

Infrared Source

Radio Source

X-Ray Source

Keywords

- astronomy infrared (111)
- astrochemistry (62)
- ism molecules (57)
- ism dust extinction (56)
- ism lines and bands (29)

Authors

- Tielens, A (38)

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Tielens, A. G. G. M.  
*Annual Review of Astronomy & Astrophysics*, vol. 46, Issue 1, pp.289-337 Sep 2008
2. [2001ApJ...554..778L](#) **Infrared Emission from Interstellar Dust. II. The Diffuse Interstellar Medium**  
Li, Aigen; Draine, B. T.  
*The Astrophysical Journal*, Volume 554, Issue 2, pp. 778-802. Jun 2001
4. [2007ApJ...657..810D](#) **Infrared Emission from Interstellar Dust. IV. The Silicate-Graphite-PAH Model in the Post-Spitzer Era**  
Draine, B. T.; Li, Aigen
5. [2008ApJ...679..310G](#) **Variations of the Mid-IR Aromatic Features inside and among Galaxies**  
Galliano, Frédéric; Madden, Suzanne C.; Tielens, Alexander G. G. M.; Peeters, Els; Jones, Anthony P.  
*The Astrophysical Journal*, Volume 679, Issue 1, pp. 310-345. May 2008
6. [2007ApJ...656..770S](#) **The Mid-Infrared Spectrum of Star-forming Galaxies: Global Properties of Polycyclic Aromatic Hydrocarbon Emission**  
Smith, J. D. T.; Draine, B. T.; Dale, D. A.; Moustakas, J.; Kennicutt, R. C., Jr.; Helou, G.; Armus, L.; Roussel, H.; Sheth, K.; Bendo, G. J.; and 9 coauthors  
*The Astrophysical Journal*, Volume 656, Issue 2, pp. 770-791. Feb 2007
7. [2000ApJ...530..817U](#) **Infrared Space Observatory Mid-Infrared Spectra of Reflection Nebulae**  
Uchida, K. I.; Sellgren, K.; Werner, M. W.; Houdashelt, M. L.  
*The Astrophysical Journal*, Volume 530, Issue 2, pp. 817-833. Feb 2000
10. [2002A&A...390.1089P](#) **The rich 6 to 9  $\mu$ m spectrum of interstellar PAHs**  
Peeters, E.; Hony, S.; Van Kerckhoven, C.; Tielens, A. G. G. M.; Allamandola, L. J.; Huggins, D. M.; Bauschlicher, C. W.

And now we got to NGC 7023 by using the literature as a filter.

The screenshot displays the Microsoft WorldWide Telescope Web Client interface. At the top, the browser address bar shows the URL <http://www.worldwidetelescope.org/webclient/default.aspx?wtml=http%3a%2f%2f>. The navigation menu includes 'Explore', 'Guided Tours', 'Search', 'View', and 'Settings'. Below the menu, a breadcrumb trail reads 'Collections > Open Collections > Link Collection >'. A small thumbnail of NGC 7023 is visible in the top left corner, labeled 'NGC 7023'. The main viewing area shows a large, detailed image of the star cluster NGC 7023, which is a bright, blue, multi-colored star cluster. The bottom control panel features a 'Look At' dropdown set to 'Sky', an 'Imagery' dropdown set to 'Digitized Sky Survey (Optical)', and an 'Info' icon. Below these are three thumbnails: 'Cepheus', 'NGC 7023', and 'NGC7023'. On the right side of the control panel, there is a '1 of 1' indicator, a compass rose, and a map of the constellation Cepheus with a yellow box indicating the location of NGC 7023. The coordinates for NGC 7023 are displayed as RA : 21h01m37s and Dec : 68:09:48. The bottom left corner of the interface shows the text 'Done'.



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- QUICK FACTS



Embedded Outflow in HH 46/47 Spitzer Space Telescope • IRAC  
NASA / JPL-Caltech / A. Noriega-Crespo (SSC/Caltech) ssc2003-06f

Credit: NASA/JPL-Caltech/A. Noriega-Crespo (SSC/Caltech), Digital Sky Survey

## HH46/47

This image from NASA's Spitzer Space Telescope transforms a dark cloud into a silky translucent veil, revealing the molecular outflow from an otherwise hidden newborn star. Using near-infrared light, Spitzer pierces through the dark cloud to detect the embedded outflow in an object called HH 46/47. Herbig-Haro (HH) objects are bright, nebulous regions of gas and dust that are usually buried within dark clouds. They are formed when supersonic gas ejected from a forming protostar, or embryonic star, interacts with the surrounding interstellar medium. These young stars are often detected only in the infrared.

The Spitzer image was obtained with the infrared array camera. Emission at 3.6 microns is shown as blue, emission from 4.5 and 5.8 microns has been combined as green, and 8.0 micron emission is depicted as red.

HH 46/47 is a striking example of a low-mass protostar ejecting a jet and creating a bipolar or two-sided outflow. The central

Seamless  
“Registration”  
through...

flickr  
+  
astrometry.net  
+  
WWT !?

# HH4647

Share This

ADD NOTE SEND TO GROUP ADD TO SET BLOG THIS ALL SIZES ORDER PRINTS ROTATE EDIT PHOTO DELETE



Embedded Outflow in HH 46/47

Spitzer Space Telescope • IRAC

NASA / JPL-Caltech / A. Noriega-Crespo (SSC/Caltech)

Instr: visible light (IRAC) bsc2003-064

Uploaded on January 6, 2009 by Alyssa\_Goodman

### Alyssa\_Goodman's photostream

16 uploads




browse

This photo also belongs to:

+ astrometry (Pool) x

### Tags

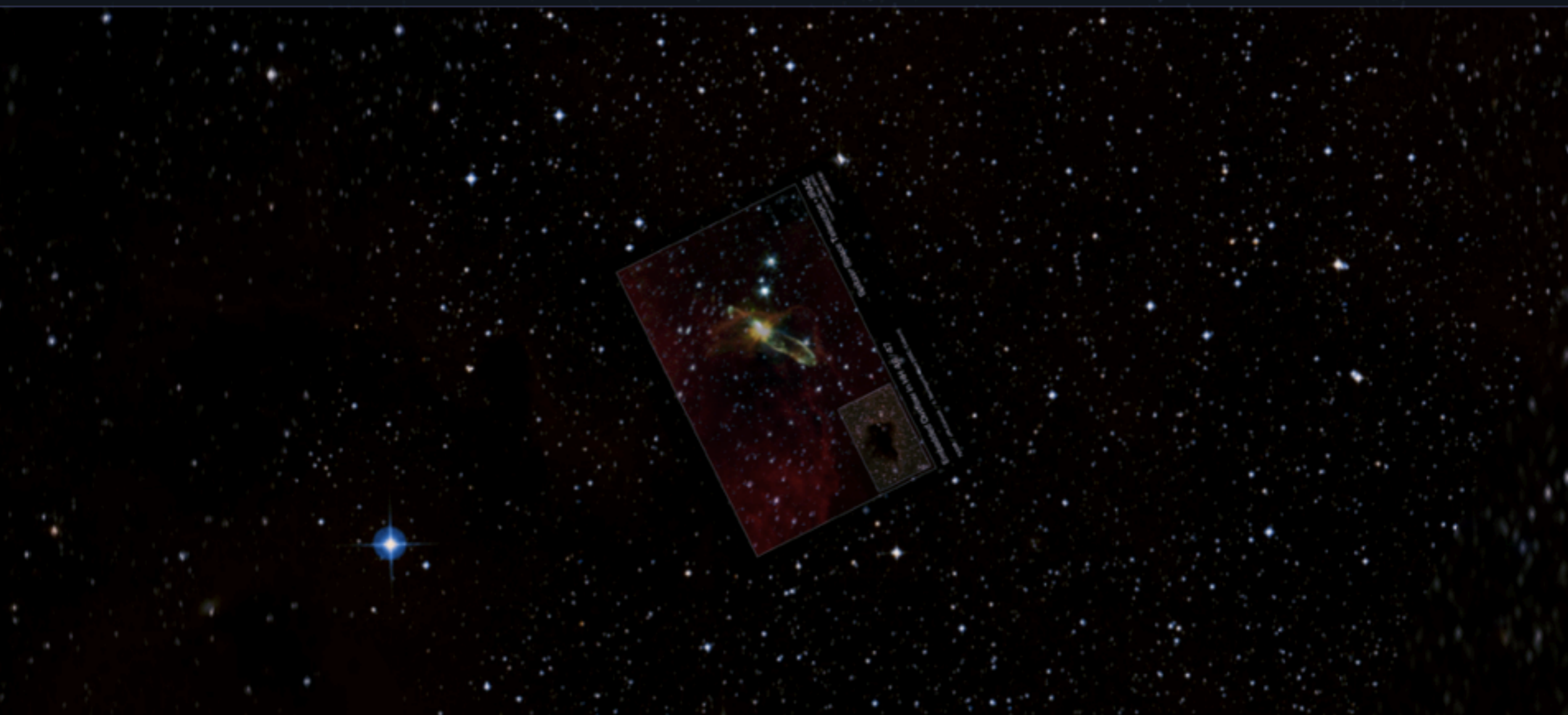
- Astrometrydotnet:version=10145 x
- Astrometrydotnet:id=alpha-200901-20629873 x
- Astrometrydotnet:status=solved x

[Add a tag](#)

### Additional Information

- All rights reserved ([edit](#))
- Anyone can see this photo ([edit](#))
- [Add to your map](#)
- Taken on [December 12, 2003](#) ([edit](#))
- [Photo stats](#)
- Viewed 7 times (Not including you)
- [Edit title, description, and tags](#)

[Flag your photo](#)



Look At: Sky | Imagery: Digitized Sky Survey (Optical) | Info: ⓘ | Image Crossfade: [Slider]

1 of 1

Vela 00:35:33

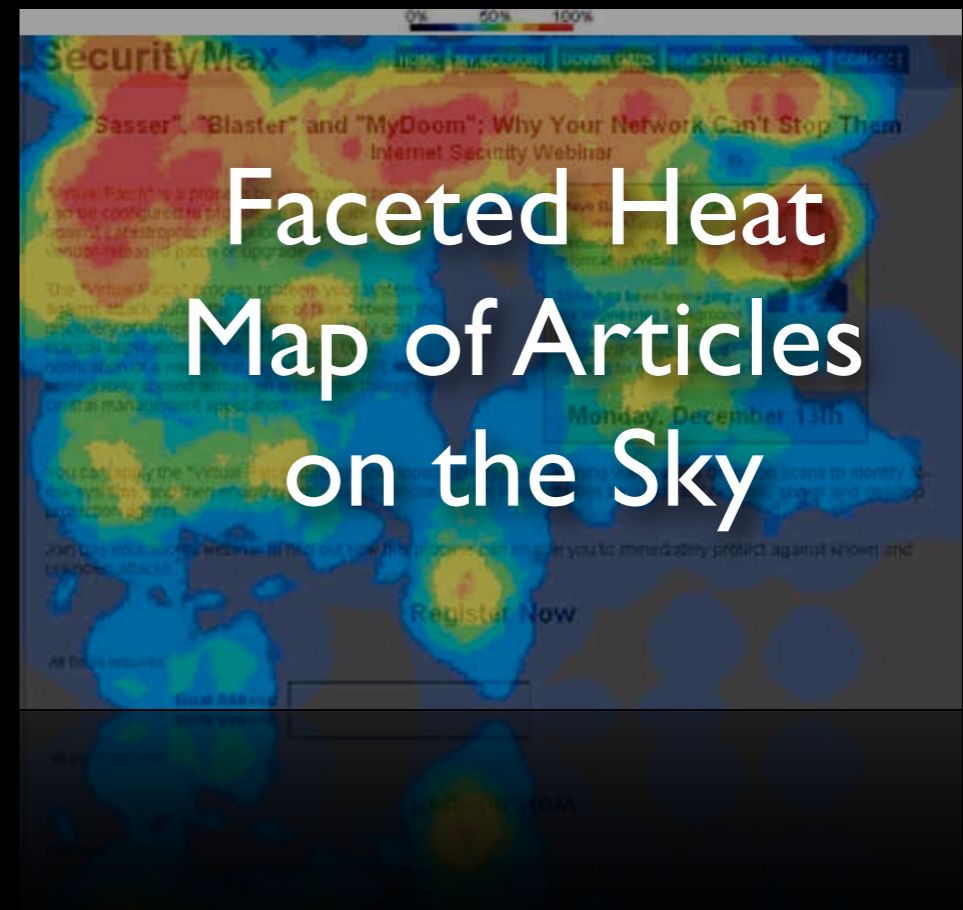
RA : 08h25m39s  
Dec : -51:01:10

Vela [Map]

# Coming Soon

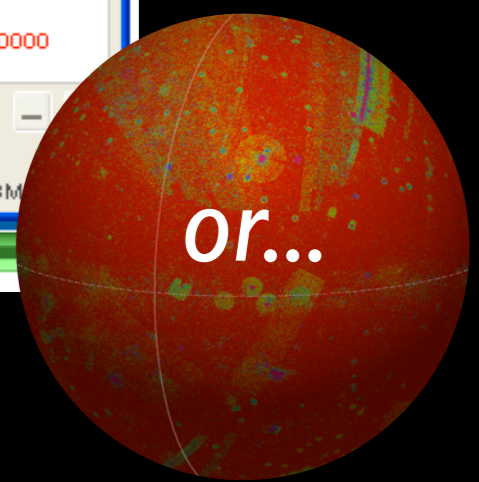
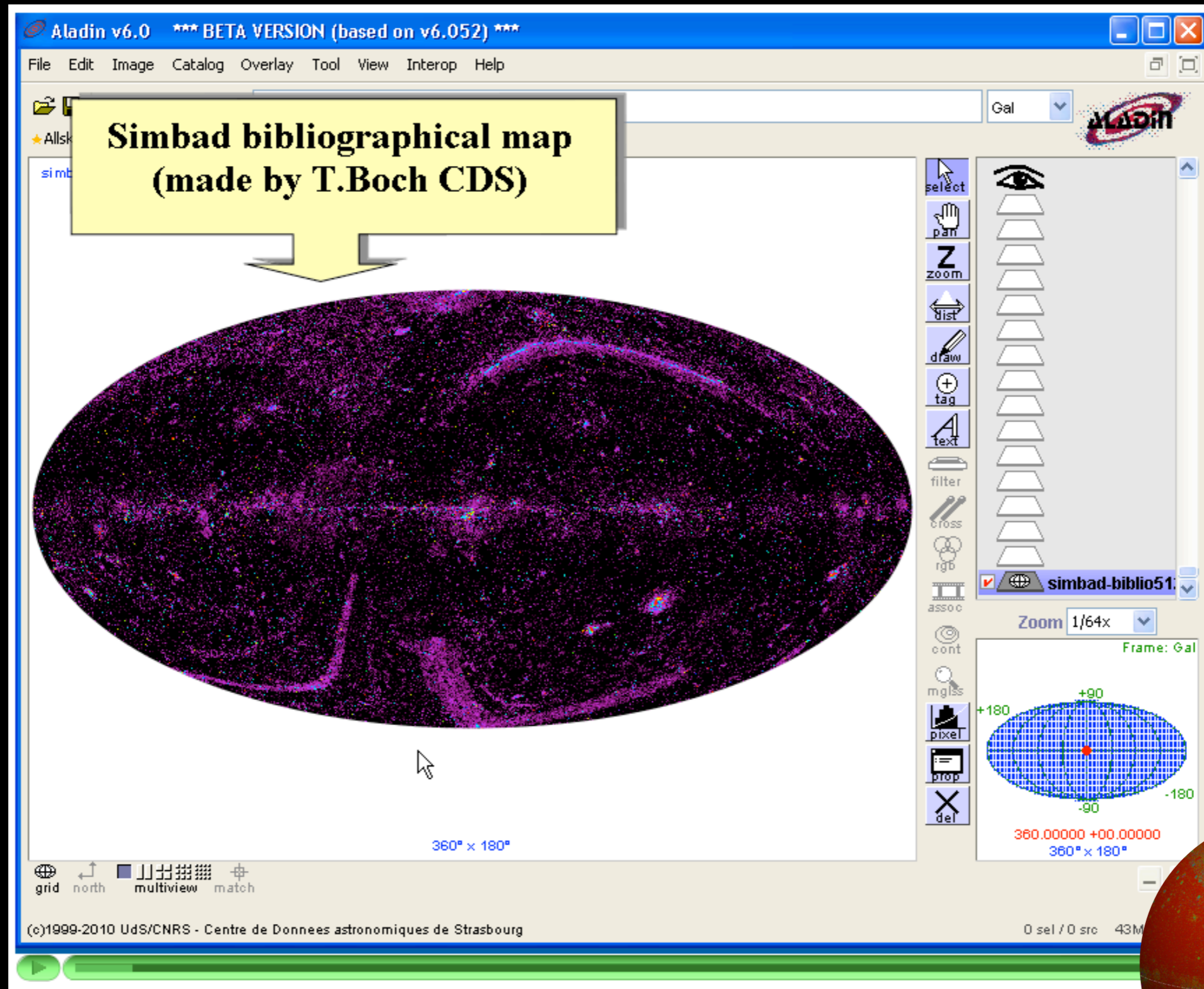
Historical Image Layer  
Extracted from ALL  
ADS holdings (using  
astrometry.net)

*ADS-Seamless-astrometry.net collaboration*



*ADS-CDS-Seamless collaboration*

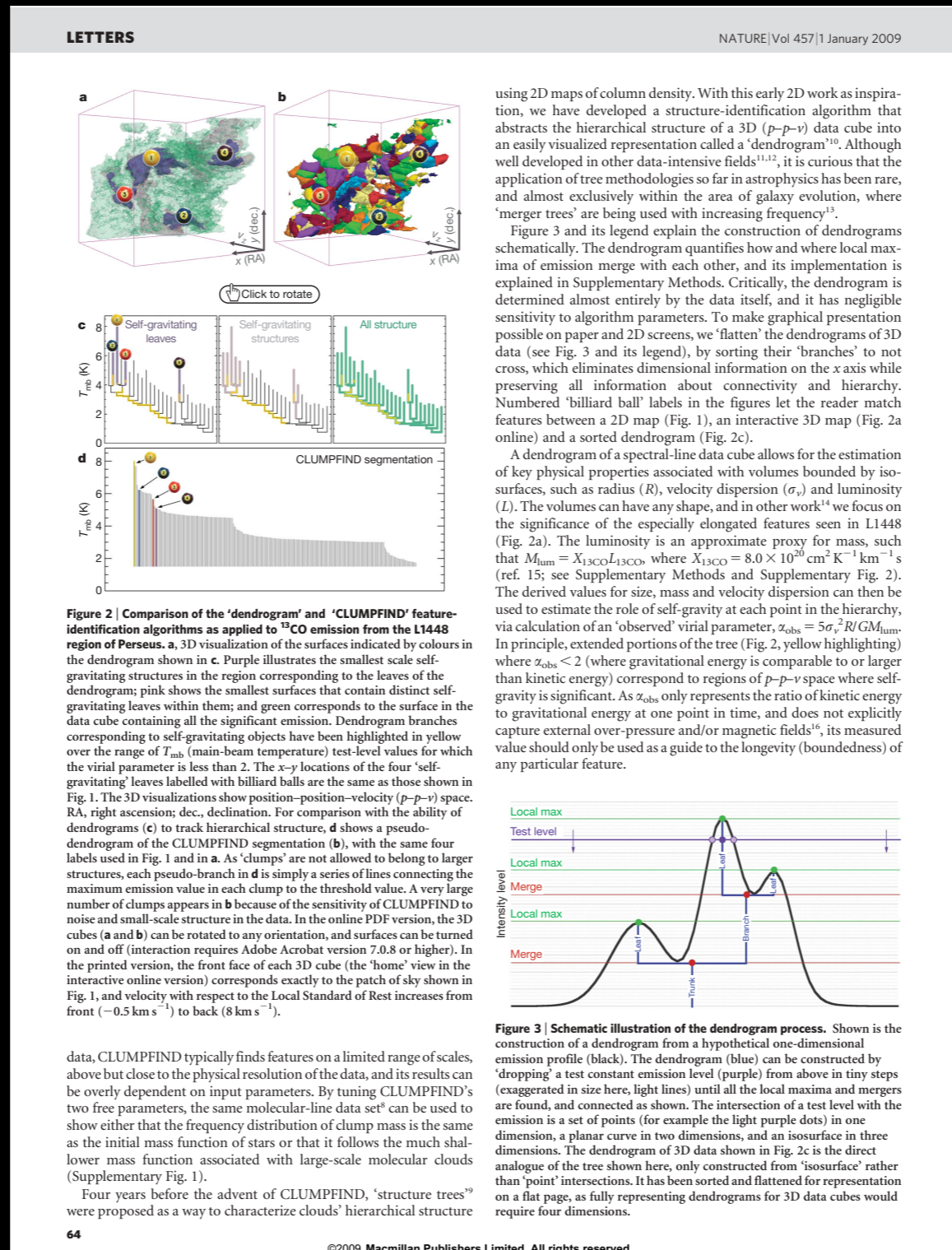
# Prototype of Articles on the Sky (April 2010)



*with thanks to CDS/Pierre Fernique*

# The future (is here)... data *IN* articles

Note: This work came from the "AstroMed" project [am.iic.harvard.edu](http://am.iic.harvard.edu)



using 2D maps of column density. With this early 2D work as inspiration, we have developed a structure-identification algorithm that abstracts the hierarchical structure of a 3D ( $p$ - $p$ - $v$ ) data cube into an easily visualized representation called a 'dendrogram'<sup>10</sup>. Although well developed in other data-intensive fields<sup>11,12</sup>, it is curious that the application of tree methodologies so far in astrophysics has been rare, and almost exclusively within the area of galaxy evolution, where 'merger trees' are being used with increasing frequency<sup>13</sup>.

Figure 3 and its legend explain the construction of dendrograms schematically. The dendrogram quantifies how and where local maxima of emission merge with each other, and its implementation is explained in Supplementary Methods. Critically, the dendrogram is determined almost entirely by the data itself, and it has negligible sensitivity to algorithm parameters. To make graphical presentation possible on paper and 2D screens, we 'flatten' the dendrograms of 3D data (see Fig. 3 and its legend), by sorting their 'branches' to not cross, which eliminates dimensional information on the  $x$  axis while preserving all information about connectivity and hierarchy. Numbered 'billiard ball' labels in the figures let the reader match features between a 2D map (Fig. 1), an interactive 3D map (Fig. 2a online) and a sorted dendrogram (Fig. 2c).

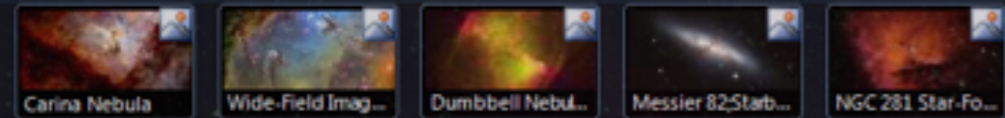
A dendrogram of a spectral-line data cube allows for the estimation of key physical properties associated with volumes bounded by isosurfaces, such as radius ( $R$ ), velocity dispersion ( $\sigma_v$ ) and luminosity ( $L$ ). The volumes can have any shape, and in other work<sup>14</sup> we focus on the significance of the especially elongated features seen in L1448 (Fig. 2a). The luminosity is an approximate proxy for mass, such that  $M_{\text{lum}} = X_{13\text{CO}} L_{13\text{CO}}$ , where  $X_{13\text{CO}} = 8.0 \times 10^{20} \text{ cm}^{-2} \text{ K}^{-1} \text{ km}^{-1} \text{ s}$  (ref. 15; see Supplementary Methods and Supplementary Fig. 2). The derived values for size, mass and velocity dispersion can then be used to estimate the role of self-gravity at each point in the hierarchy, via calculation of an 'observed' virial parameter,  $\alpha_{\text{obs}} = 5\sigma_v^2 R / GM_{\text{lum}}$ . In principle, extended portions of the tree (Fig. 2, yellow highlighting) where  $\alpha_{\text{obs}} < 2$  (where gravitational energy is comparable to or larger than kinetic energy) correspond to regions of  $p$ - $p$ - $v$  space where self-gravity is significant. As  $\alpha_{\text{obs}}$  only represents the ratio of kinetic energy to gravitational energy at one point in time, and does not explicitly capture external over-pressure and/or magnetic fields<sup>16</sup>, its measured value should only be used as a guide to the longevity (boundedness) of any particular feature.

data, CLUMPFIND typically finds features on a limited range of scales, above but close to the physical resolution of the data, and its results can be overly dependent on input parameters. By tuning CLUMPFIND's two free parameters, the same molecular-line data set<sup>8</sup> can be used to show either that the frequency distribution of clump mass is the same as the initial mass function of stars or that it follows the much shallower mass function associated with large-scale molecular clouds (Supplementary Fig. 1).

Four years before the advent of CLUMPFIND, 'structure trees'<sup>9</sup> were proposed as a way to characterize clouds' hierarchical structure



Studies >



“Old Data”

[astrometry.net/flickr/WWWT](http://astrometry.net/flickr/WWWT)

“New Data”

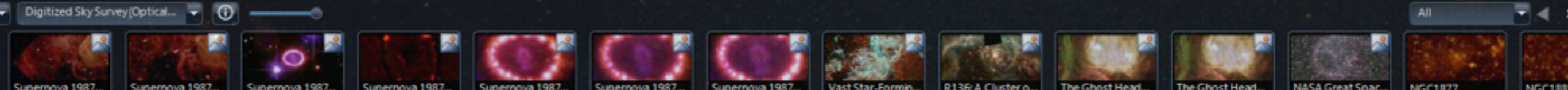
WWWT/ADS/SIMBAD/NAO

WWWT as API

“Your Data”

“My Data”

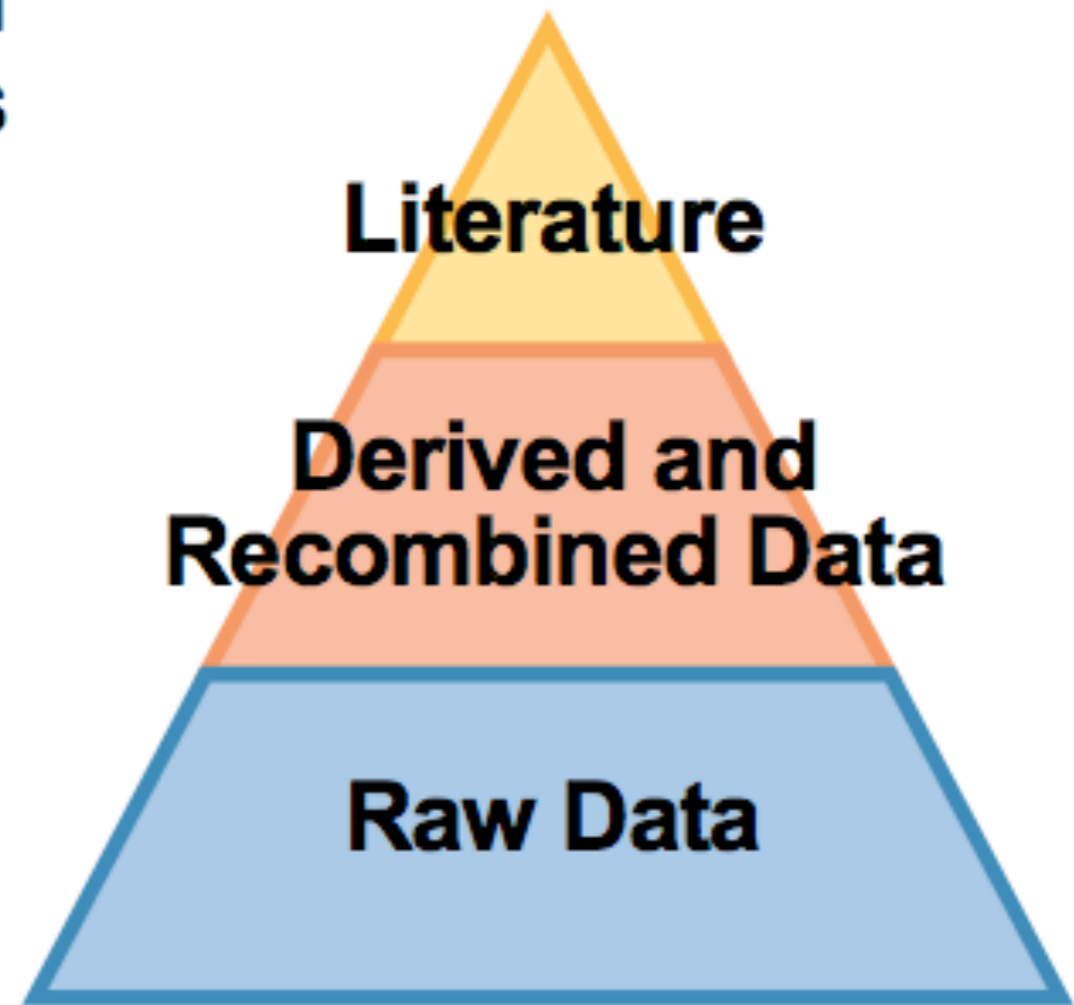
3D PDF



# Jim Gray & Alex Szalay had it right (in 2004)

## All Scientific Data Online

- Many disciplines overlap and use data from other sciences
- Internet can unify all literature and data
- Go from literature to computation to data back to literature
- Information at your fingertips for everyone-everywhere
- Increase Scientific Information Velocity
- Huge increase in Science Productivity



The World Wide Telescope  
an Archetype for Online-Science

Jim Gray (Microsoft)

Alex Szalay (Johns Hopkins University)

Microsoft Academic Days in Silicon Valley

<http://research.microsoft.com/~gray/talks>



*How do we increase the fraction of astronomy researchers who know about these tools?*



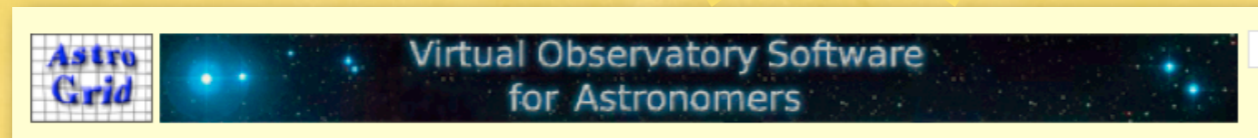
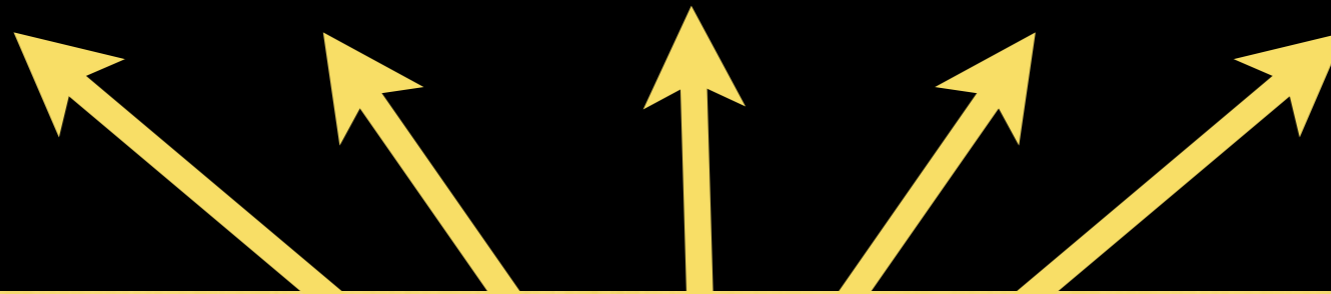
User Groups  
(CfA now has one)



*+Suggestions?!*



# User Groups (CfA now has one)



**NVO**  
NATIONAL VIRTUAL OBSERVATORY  
...the Universe at your fingertips

Welcome to the New NVO Home Page! We welcome your **feedback** on the new site.

Discover, retrieve, and analyze astronomical data from archives and data centers around the world.

- Need help? Not sure how to start? [Getting Started with NVO](#)
- Collect all data at a given position. [DataScope](#)
- Count matches between catalog entries and given positions. [Inventory](#)
- Query databases and cross-match object lists. [Open SkyQuery](#)
- Find data collections and catalogs by searching their descriptions. [Directory](#)
- Integrate data from multiple positions and datasets. [VIM](#)
- Query the VO from the command line. [VO-CLI](#)
- Convert text tables to the VOTable format used by VO applications. [Table Tools](#)
- Do more with NVO. [Data Analysis & More](#)

oGrid is the doorw  
ble astronomers to  
OSpace, query dat  
automate sequences

**The Aladin Sky Atlas**

[Download Aladin on your machine](#) | [Start Aladin applet \(fr - US - Ja - In - UK - Co\)](#)

**New: Aladin release 6 - April 2009**  
Measurement browser by interactive histogram, Outreach mode, SAMP compatible, RICE compression support, etc.

**New: The Aladin manual - April 2009 - The full user manual in English**

**Description** Aladin is an interactive software sky atlas allowing the user to interactively access related data and information from the service and other archives for all known sources in the field. Created in 1999, Aladin has become a widely-used VO portal such as locating data of interest, accessing and exploring data, multi-wavelength data. Compliance with existing or emerging standards with other visualisation or analysis tools, ability to easily copy data allowing Aladin to be a powerful data exploration and science enabler.

The Aladin sky atlas is available in three modes: a Java Standalone application, a Java applet interface and a simple previewer.

HARVARD UNIVERSITY  
**TSC**  
Time Series Center

register | login | CFA | IIC

Home Search Projects Surveys Publications People

Home > Search

Search Setting

Searching method:  
 VPT  PDI  GPU

Survey:  
 ASAS  OGLE2

Open in new window.

Use a File  
Use a time series data from your local machine to search.

OR

Draw It  
Draw the curve you would like to search for.

*How do we increase the number of people who create and interlink new tools?*

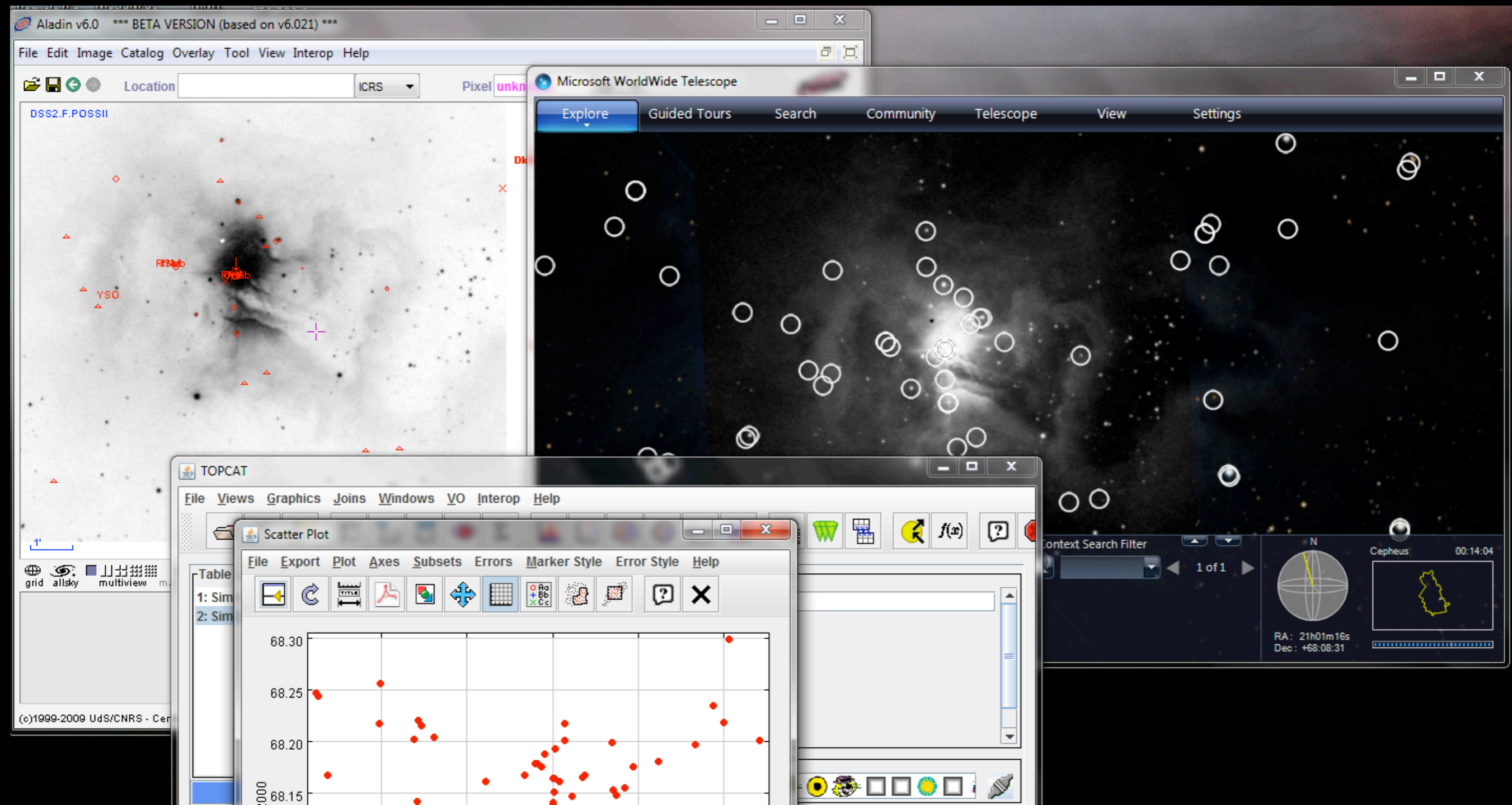


**Kiva** model: WWT Partners & “VAO Associates”

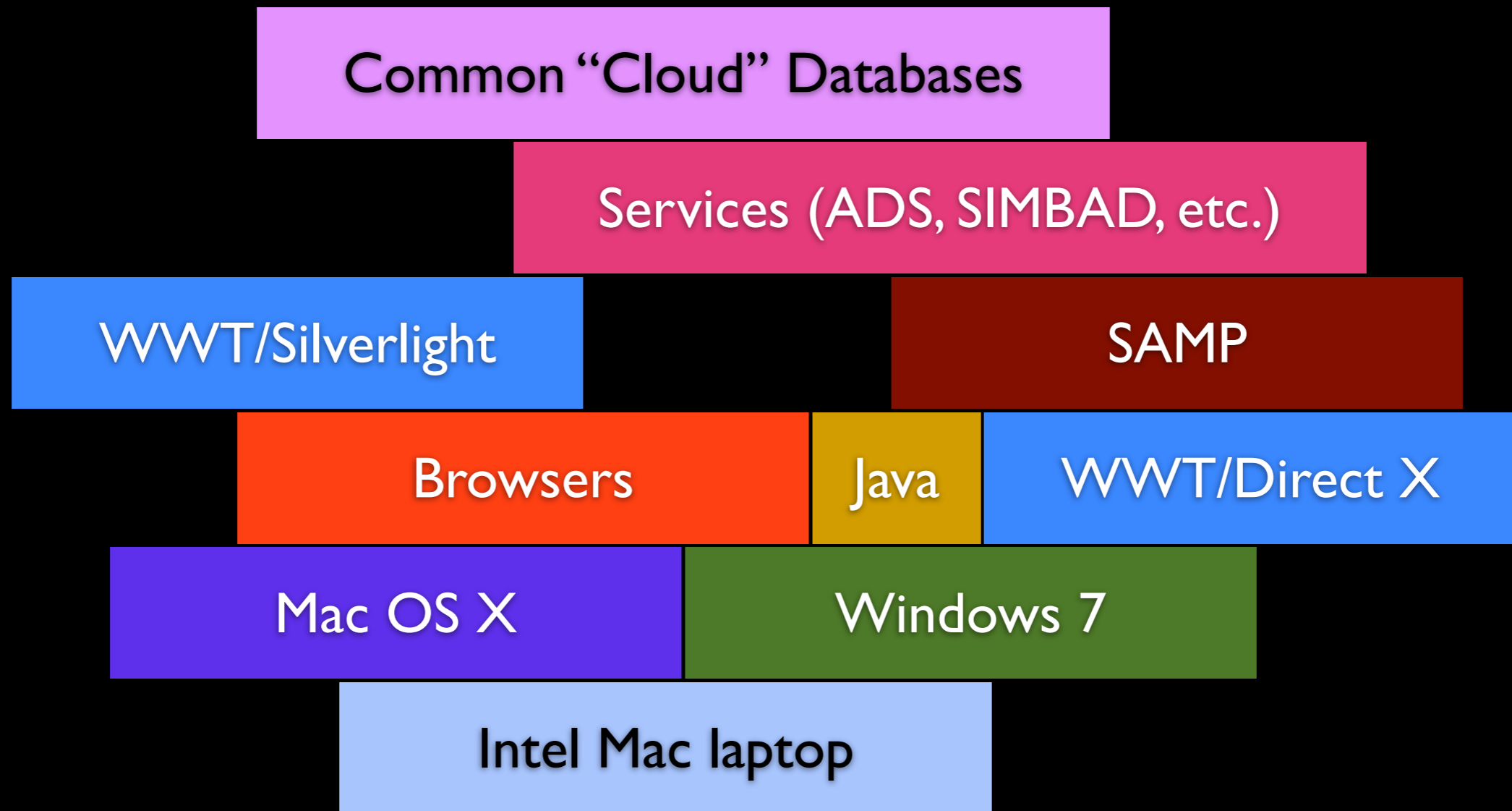
*How do we organize such diverse tools, so as to make them interoperably useful?....*

“SAMP” is a great technical start, but offers a very significant user interface challenge.

# SAMP



*Think about the “modules” needed to make this work...but do the details matter, to your research, if the system works seamlessly?*



# Seamless Astronomy

AstroNavigator

Literature Viewer

Project 1 Project 2 Project 3 Edit

QSO MgII absorption lines observed

Authors: Drinkwater, Webster R.L., et al.

Description: The results of a large R-band

3D map of volume density

Fraction of Emission in Self-gravitating Structures vs. Beam Size

Scale (pc)

L1448 Simulation

IC 348 Example Requires

Footprint

C 348 RA = 56.14

results 1-20 of 907

Semantic Search

Self-bias for Analytics Results

Data Viewer (e.g. WWT)

Ar3Dive Browser

Mockup based on work of Eli Bressert, excerpted from NASA AISRP proposal by Goodman, Muench, Christian, Conti, Kurtz, Burke, Accomazzi, McGuinness, Hendler & Wong, 2008

# AstroNavigator

Project 1 Project 2 Project 3 Edit

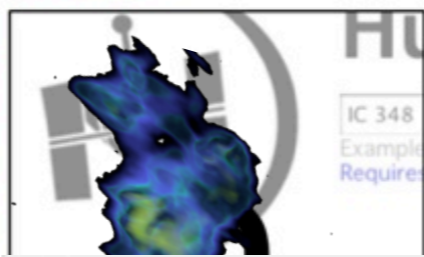
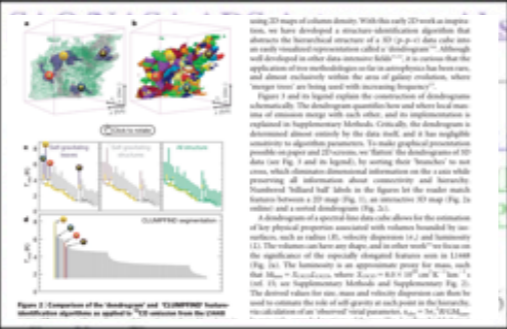
## QSO MgII absorption lines observed

Authors **A**

Drinkwater, Webster R.L., et al.

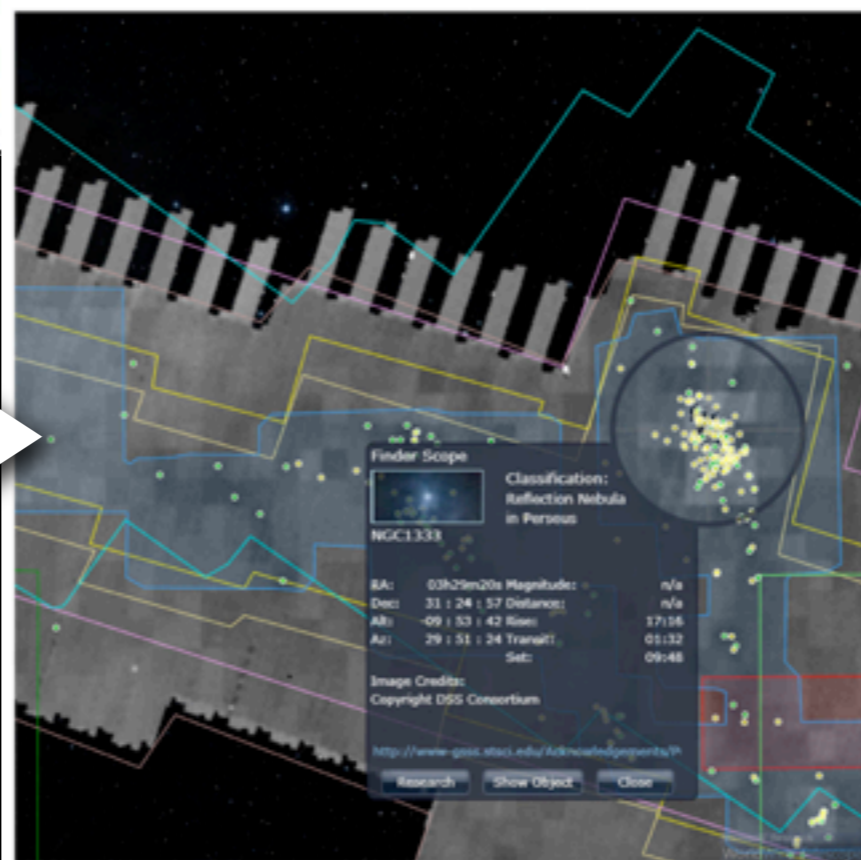
Description

The results of a large R-band



COMPLETE Data Coverage Tool  
<http://www.worldwidetelescope.org/COMPLETE/WWTCoverageTool.html#>

# Fact (right now)



### COMPLETE Data Available

Control Panels: General Overview General Settings

Full-Cloud Data (Phase I, All Data Available)

Dataset	Show	Perseus	Ophiuchus	Serpens	Link
GBT: HI Data Cube	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Data
IRAS: Av/Temp Maps	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Data
FCRAO: 12CO	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Data
FCRAO: 13CO	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Data
JCMT: 850 microns	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Data
Spitzer c2d: IRAC 1.3 (3.6,5.8 μm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Data
Spitzer c2d: IRAC 2.4 (4.5,8 μm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Data
CSO/Bolocam: 1.2-mm	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Data
Spitzer MIPS: Derived Dust Map	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Data

Targeted Regions (Phase II, Some Data Not Yet Available)

CTIO/Calar Alto: NIR (J,H,Ks)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Data
IRAM 30-m: N2H+ and C18O	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Data
IRAM 30-m: 1.1-mm continuum	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Data
Megacam/MMT: r,i,z images	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Data

Catalogs & Pointed Surveys

NH3 Pointed Survey	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Data
YSO Candidate list (c2d)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Data

# Fiction (for now)

but, coming very soon, e.g. ASCOT



ADS Query Results

SAO/NASA Astrophysics Data System (ADS)

Query Results from the ADS Database

Selected and retrieved 200 abstracts.

#	Bibcode	Score	Date	List of Links	Access Control Help
1	2006glsw.book..269S Schneider, P.	81.000	n/a 2006	A E X R C c U	
3	2003ARA&A..41..645R Refregier, Alexandre	61.000	n/a 2003	A E E X R C c U H	
4	2008ARNPS..58..99H Hoekstra, Henk; Jain, Bhuvnesh	51.000	Nov 2008	A X R C c U	
5	2003astro.ph..6465S Schneider, Peter	44.000	Jun 2003	A X R C c U H	
6	2006MNRAS..368.1323H Heymans, Catherine; Van Waerbeke, Ludovic; Bacon, J.	41.000	May 2006	A E G X R C c U	

“Faceted Browsing”

Why?

an easy to use, web based application using the IVOA which allows a user to perform:

observations

data

faceted browsing

allows, observations to participate in an infrastructure which allows one to:

Fork me on GitHub

- create intelligent applications which can reason and inference with
- publish resources as Linked Data, externally indexed.
- easily aggregate metrics of interest to publishers, funding agencies
- let others build applications on this substrate using SPARQL queries

We will be carrying out these efforts as part of ADS Labs.

### Bootstrapping in ADS Labs

ADS Labs is an effort to put out more forward thinking, somewhat unstable applications will be incubated in ADS Labs before being pushed out to ADS

1. The results of queries on a bibliographic database will be made available in a user interface on the above (see first image below)
2. We will switch to a semantic backend with a SPARQL interface
3. Development on Ontologies (which this site details) continues and
4. Finally we'll combine the databases so as to have one large semantic application below.

### Examples of Applications

Here are examples of what such applications might look like:

Da Browser http://dabrowser.semantic.ads.org

lmc

Advanced

Data Literature Objects

Mechos 1367

DGLE lmc\_scl

Object One

Object Two

Object Three

Microensing in the LMC

OGLE Variables in the LMC

Object One

Object Two

Object Three

Variability

Wavelength

Optical

Xray

Shape

Light curves?

Spectra?

Modular Functionality

Download!

created with Balazs Mockups - www.balazsmockups.com

Ongoing “ADS Labs” Work: Alberto Accomazzi, Rahul Davé, Alberto Pepe, Michael Kurtz, Gus Muench, AG  
Thanks to ADS (NASA)/VAO(NASA+NSF)/MSFT funding.

# Article Markup via ADS will be similar to working Life Sciences Tool (thanks IIC!)



SCF Annotations

The neural stem cell microenvironment

Save Annotations

Original

Listings

Enter term to search for:

Go

Terms: neurogenesis :59 ( x d a s o ) growth :30 ( x d a h o ) cell-cell signaling :28 ( x d a s o )

Annotation id 6. Updated at 2009-07-20 19:47:51.020766 by Mining Robot.

- Ilias Kazanis<sup>1,4</sup>,
- Justin Lathia<sup>1,2</sup>,
- Lara Moss<sup>1,3</sup>,
- Charles French-Constant<sup>1,3</sup>

<sup>1</sup>Department of Pathology, University of Cambridge, Tennis Court Road, CB2 1QP, Cambridge, UK

<sup>2</sup>Current address: Dept. of Surgery, Division of Neurosurgery, Duke University Medical Center, Durham, NC 27710, USA

<sup>3</sup>Current address: MRC Centre for Regenerative Medicine, The Queen's Medical Research Institute, 47 Little France Crescent

In mammals, neural stem cells appear early in development and remain active within the central nervous system for the whole life span and reside within changing microenvironments whilst retaining the basic properties of a stem cell: multipotentiality and the ability to self-renew along with the fundamental structural components and signalling molecules of their microenvironments. In early neural development, neural stem cells; they are situated among other neuroepithelial cells and they are exposed to various signals such as retinoic acid, sonic hedgehog, and glial cells and the complexity of their microenvironment increases due to the emergence of various types of neuronal progenitor cells, astroglial morphology and reside in specific microenvironments that are called neurogenic niches; small neurogenic islands which are operating during embryonic development.

## 1. The embryonic neural stem cell (NSC) microenvironment

Central nervous system (CNS) development is an intricate process relying on a series of mechanisms precisely regulated in time and space to reach their respective destination within an approximately one-week period during embryogenesis. The embryonic CNS is a dynamic structure, constantly increasing in size due to mitogenesis, while the stem

SAO/NASA Astrophysics Data System (ADS)

Query Results from the ADS Database

Selected and retrieved 200 abstracts.

#	Bibcode	Score	Date	List of Links	Access Control Help
1	2006glsw.book..269S Schneider, P.	81.000	n/a 2006	A E X R C c U	
3	2003ARA&A..41..645R Refregier, Alexandre	61.000	n/a 2003	A E F X R C c U H	
4	2008ARNPS..58..99H Hoekstra, Henk; Jain, Bhuvnesh	51.000	Nov 2008	A X R C c U	
5	2003astro.ph..646SS Schneider, Peter	44.000	Jun 2003	A X R C c U H	
6	2006MNRAS.368.1323H Heymans, Catherine; Van Waerbeke, Ludovic; Bacon, John	41.000	May 2006	A E G X R C c U	

“Faceted Browsing”

Annotate

Delete All | Add Mapping

go : nervous system development

Delete | Alter

go : cell growth Delete | Alter

go : growth pattern Delete | Alter

go : cell-cell signaling Delete | Alter

go : system development Delete | Alter

go : growth Delete | Alter

go : stem cell development Delete | Alter

go : cell development Delete | Alter

developmental process they  
biological characteristi  
em is established, neu  
neurogenesis commen  
g molecules. Finally, d  
d under the control of

is present in the adult

# ASCOT (University of Washington)

---

- **Research in a Browser**

- **“iGoogle” for Astronomy**

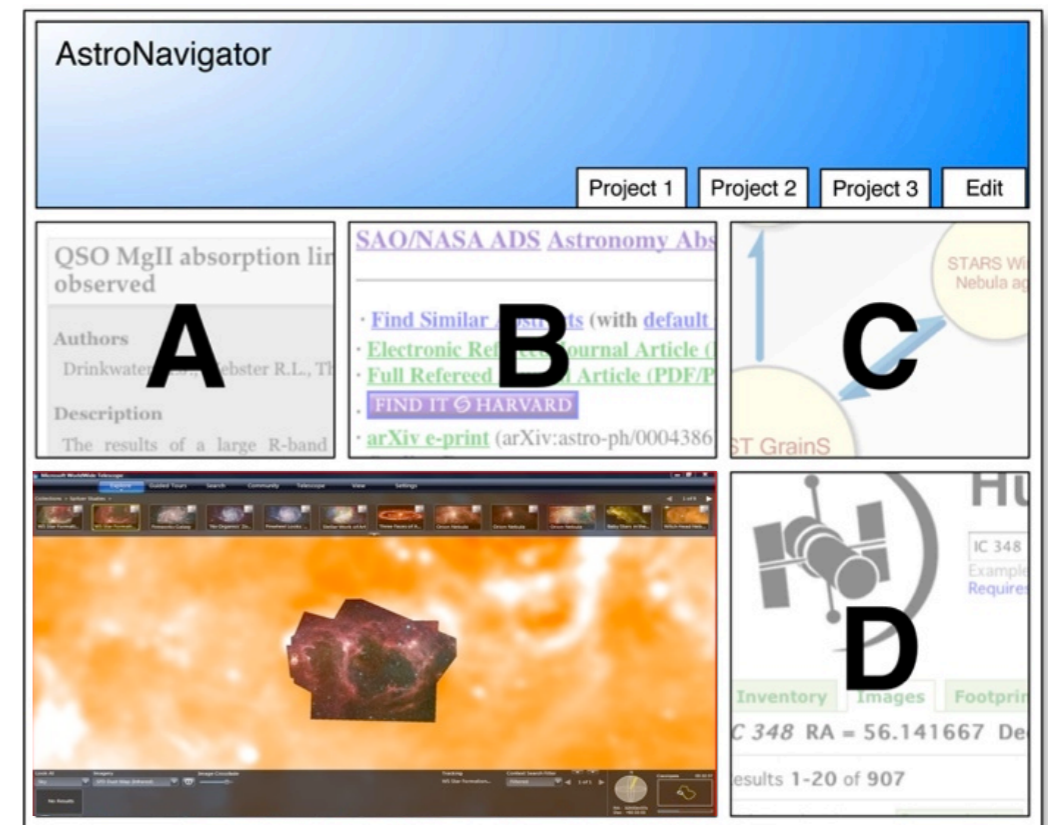
- Collections of simple atomic applications (gadgets)
    - Users choose the view they want
    - All gadgets can communicate with each other

- **Customizable and sharable**

- Users can build and share “mashups”
    - Widgets are simple to create
    - Widgets call virtual observatory resources

- **Efficient**

- Communication is within the browser (fast)
    - Built from javascript (standard)



Select Gadgets

Rearrange based on your preference

The screenshot displays the SISIS Gadget Server interface. At the top, there is a navigation bar with the text "SISIS Gadget Server" and "Signed-in as ajc | Sign-out | Help". Below this is a toolbar with buttons for "Add Gadgets", "Add New Tab", "Clone Active Tab", and "Remove Active Tab". The main content area is divided into several sections:

- Home**: A breadcrumb trail showing "Home", "HR Diagram", and "HR Diagram 2".
- Input Coords**: A form with input fields for "RA:" and "dec:", and a "GO" button.
- Get Sky Objects**: A section with a "Select Service" dropdown, a "Max: 50" input field, and a "Get Objects" button.
- Name Resolve**: A section with an "Input Object Name" field and a "Go" button.
- DataGadget v0.1**: A central panel displaying "DataGadget v0.1".
- Sky Viewport**: A large window showing a star map with constellation labels: Ursa Major, Lynx, Leo Minor, Gemini, Cancer, Leo, Canis Minor, Sextans, and Monoceros. It includes a compass, a zoom slider, and coordinates: "RA 8h40m58.67s, Dec. 25°00'00.00".



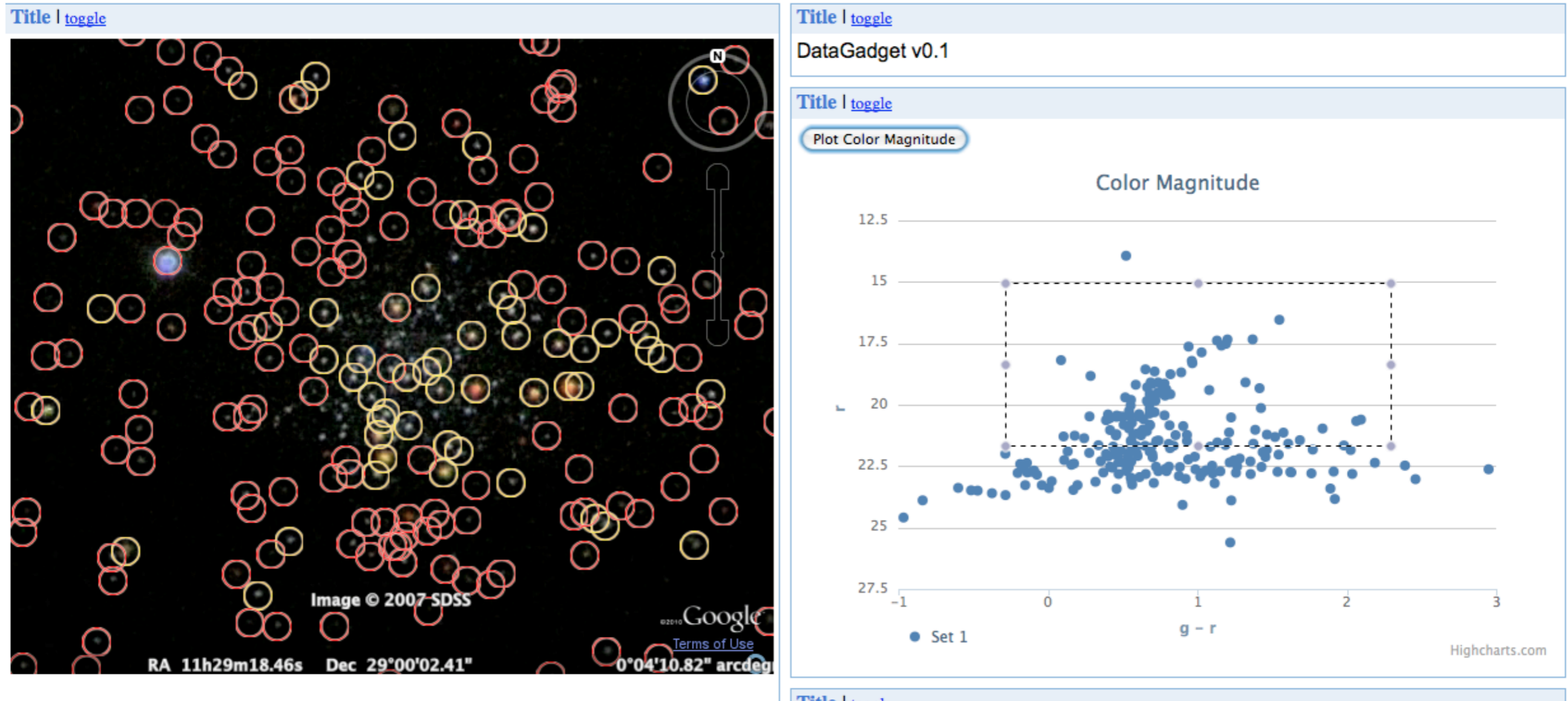
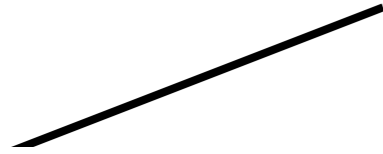
Query the SDSS based on viewport  
Name resolver and zoom to field  
and return the source overlaid on images

The screenshot shows a web browser window titled "Gadget Server" with a navigation bar containing "Add Gadgets", "Add New Tab", "Clone Active Tab", and "Remove Active Tab". The main content area features several gadgets: "Sky Viewport" on the left, "DataGadget v0.1" in the center, "Input Coords" on the right, and "Name Resolve" at the bottom right. The "Sky Viewport" displays a star field with red circles around objects, including "Messier 87", "IC 3443", and "NGC 4478". It includes a compass, zoom controls, and coordinate information: "RA 12h30m10.20s Dec 12°24'55.39" 0°28'24.0". The "DataGadget v0.1" has a "Get Sky Objects" section with a dropdown set to "SDSS", a "Max: 50" field, and a "Get Objects" button. The "Input Coords" gadget has fields for "RA:" and "dec:" with a "GO" button. The "Name Resolve" gadget has a text input field containing "m87" and a "Go" button. Black arrows point from the text at the top to the "Sky Viewport", "DataGadget v0.1", and "Input Coords" gadgets. A larger arrow points from the text at the bottom to the "DataGadget v0.1" gadget.

All gadgets communicate through the data gadget



Create, store and share multiple views of gadgets



Interaction allows selections to be shown on the viewport

# The Fourth Paradigm

a nature network blog by The Fourth Paradigm

HOME ARCHIVE ABOUT

SEARCH THIS BLOG



## A look at the editors: Jeff Dozier

SHARE



This week, we spend some time with Jeff Dozier, professor in the Donald Bren School of Environmental Science & Management at the University of California, Santa Barbara, and learn more about what led him to his involvement with The Fourth Paradigm (first the book, now the blog). Here Jeff gives us a peek into his background starting with his love for mountain climbing, leading to his career as an educator, researcher and even the winner of the second annual Jim Gray eScience Award. With that, I'll hand it over to Jeff ...

*"My path to a career as an academic scientist was not straightforward. About the time I graduated from high school, I stopped playing tournament tennis and started rock climbing, and that was really my "major" in college. I had to leave school after a year-and-a-half because my grades were so bad. I dropped out, worked for a year, and made enough money to leave the country for 15 months, during which I studied German, climbed in England, Wales, Scotland, Poland, Austria, Italy, and France, and hitchhiked from Europe to India, from where I flew home. At the time (1966) I could not travel overland into Burma, now called Myanmar.*

*By then, I was 21 years old, realized that studying the Earth was what I wanted to do, and was able to judiciously mix school and climbing and do well at both. I began expedition climbing, helped lead six expeditions to the Hindu*

<http://blogs.nature.com/fourthparadigm/>

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The Fourth Paradigm  
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### Recent Nature Network Posts

- Ice Cream Castles
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- University of California Commission on the Future report released

All nature network blogs



### OTHER POINTS OF INTEREST

External Research Team Blog  
For more on Microsoft's External Research team.

The Fourth Paradigm  
Presenting the first broad look at the rapidly emerging field of data

### RECENT ENTRIES

A look at the editors: Jeff Dozier

A look at the editors: Mark Abbott

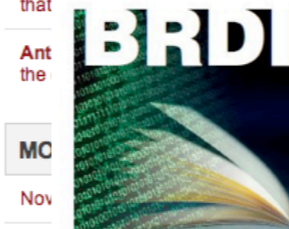
Phil Bourne on accelerating the

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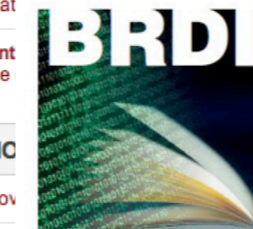
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# New Resources



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The mission of the Board on Research Data and Information is to improve the stewardship, policy, and use of digital data and information for science and the broader society.

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3. Encourage and facilitate collaboration across disciplines, sectors, and nations with regard to common interests in research data and information activities.
4. Monitor, assess, and contribute to the development of U.S. government and research community positions on research data and information programs and policies.
5. Initiate or respond to requests for consensus studies, workshops, conferences, and other activities within the Board's mission, and provide oversight for the activities performed under the Board's auspices.
6. Broadly disseminate and communicate the results of the Board's activities to its stakeholders and to the general public.

### Upcoming Events

The Future of Scientific Knowledge  
Discovery in Open Networked  
Environments  
March 10-11, 2011 - details TBA

BISO-BRDI-CFRS International  
Symposium on the Case for International  
Scientific Data Sharing: A Focus on  
Developing Countries  
April 18-19, 2011 - details TBA

### Recent Reports

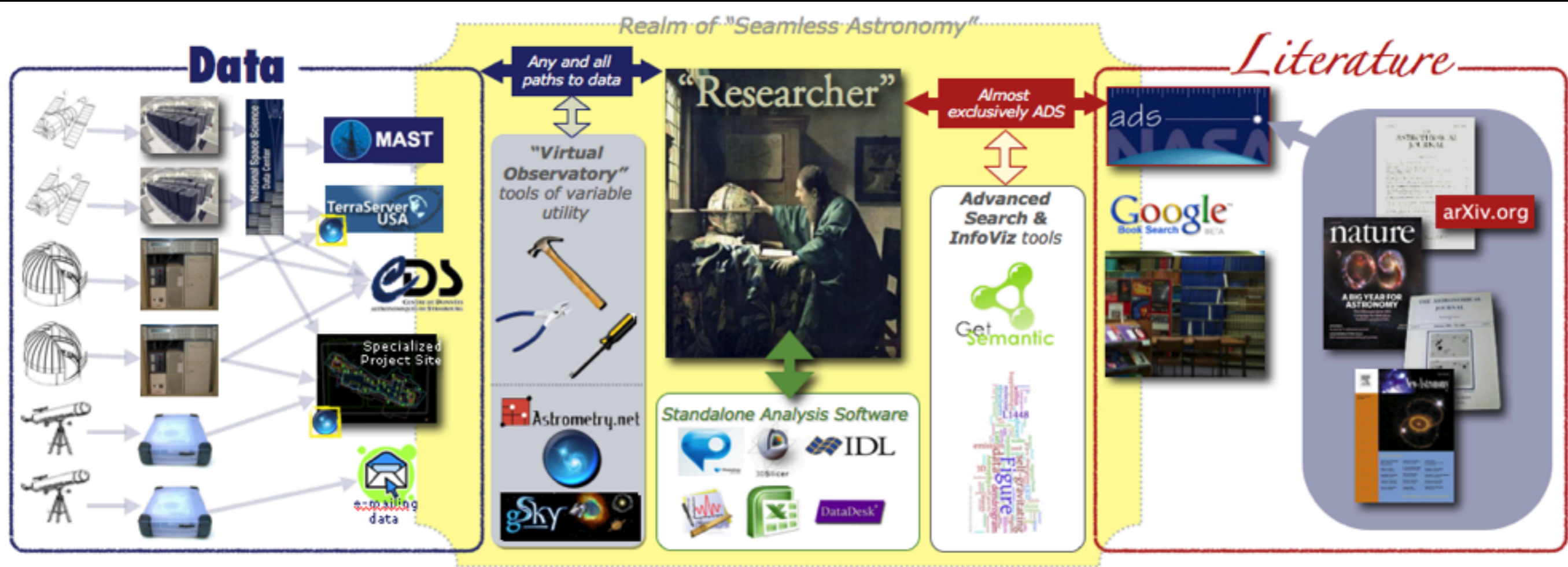
The Changing Role of Libraries in Support  
of Research Data Activities, June 3, 2010:  
Meeting Recap

GEOSS Data Sharing Symposium,  
November 16, 2009: Meeting Recap

U.S.-China Roundtable on Scientific Data  
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# New, Seamless, Science?



**NCBI GenBank Overview**

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**What is GenBank?**

GenBank® is the NIH genetic sequence database, an annotated collection of all publicly available DNA sequences (*Nucleic Acids Research*, 2008 Jan;36(Database issue):D25-30). There are approximately 106,533,156,756 bases in 108,431,692 sequence records in the traditional GenBank divisions and 148,165,117,763 bases in 48,443,067 sequence records in the WGS division as of August 2009.

The complete [release notes](#) for the current version of GenBank are available on the NCBI ftp site. A new release is made every two months. GenBank is part of the [International Nucleotide Sequence Database Collaboration](#), which comprises the DNA DataBank of Japan (DDBJ), the European Molecular Biology Laboratory (EMBL), and GenBank at NCBI. These three organizations exchange data on a daily basis.

An example of a GenBank [record](#) may be viewed for a *Saccharomyces cerevisiae* gene.

**In The News: 2009 H1N1 Flu Virus (Swine Flu)**

The Centers for Disease Control and Prevention and other health officials are actively tracking the recent emergence of human cases of swine influenza A (H1N1) virus infection. Influenza A virus sequences from patients affected by this strain are being submitted to GenBank and can be accessed through the [NCBI Flu Resource](#)

U.S. Department of Health & Human Services www.hhs.gov

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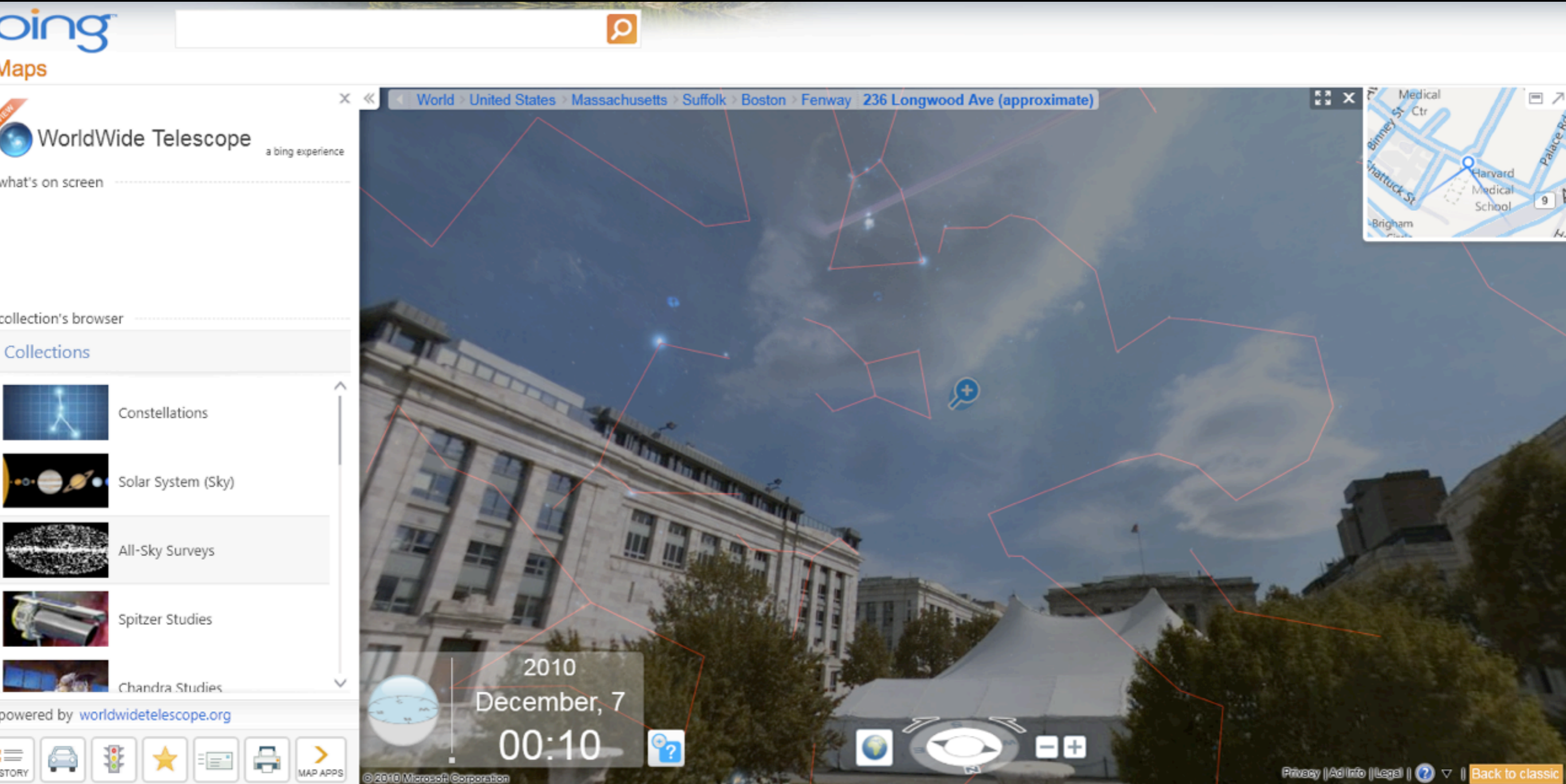
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# Seamless Astronomy

Alyssa A. Goodman

Harvard-Smithsonian Center for Astrophysics



with

Alberto Accomazzi, Douglas Burke, Gus Muench, Michael Kurtz & Alberto Pepe (Harvard-Smithsonian CfA); Eli Bressert (U. Exeter); Tim Clark (Massachusetts General Hospital/Harvard Medical School); Chris Borgman (UCLA); Jonathan Fay & Curtis Wong (Microsoft Research)