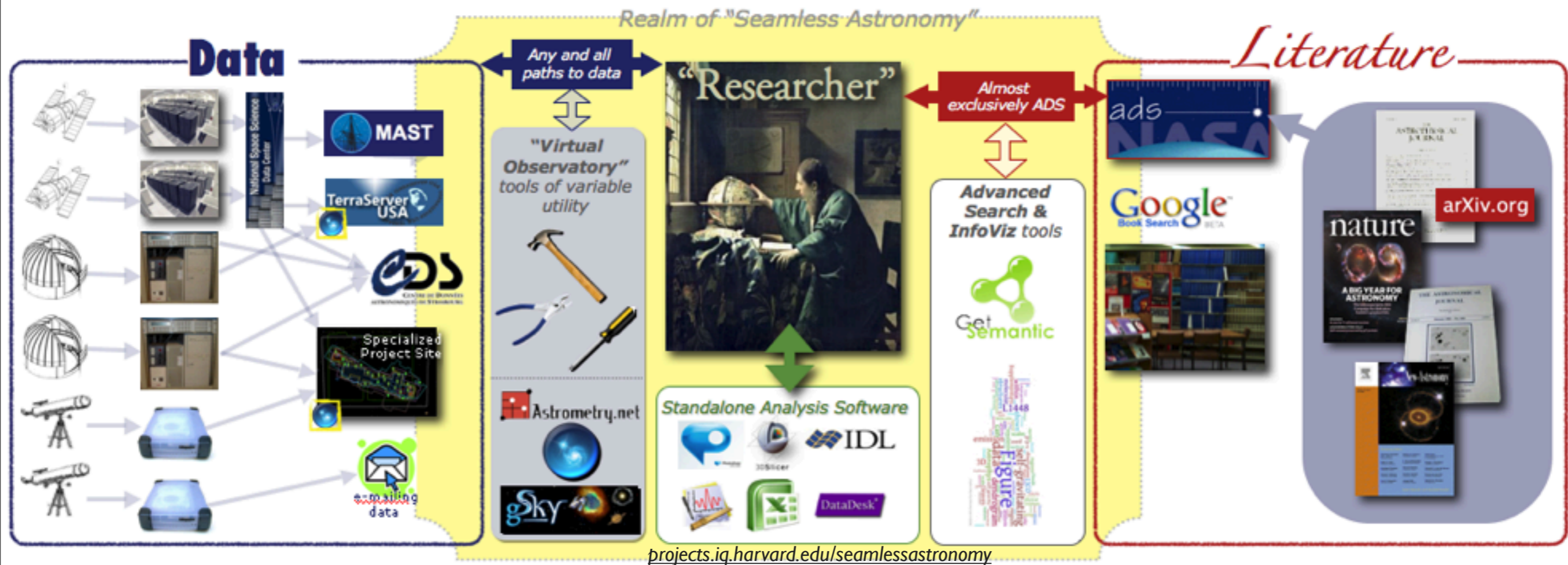


Seamless Astronomy

How astronomers share, explore & discover



Alyssa A. Goodman
Harvard-Smithsonian Center for Astrophysics

with

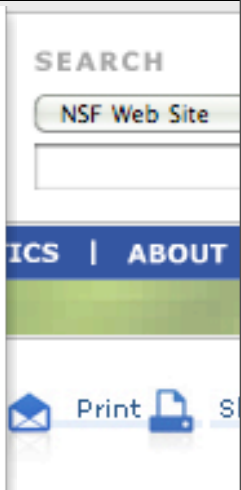
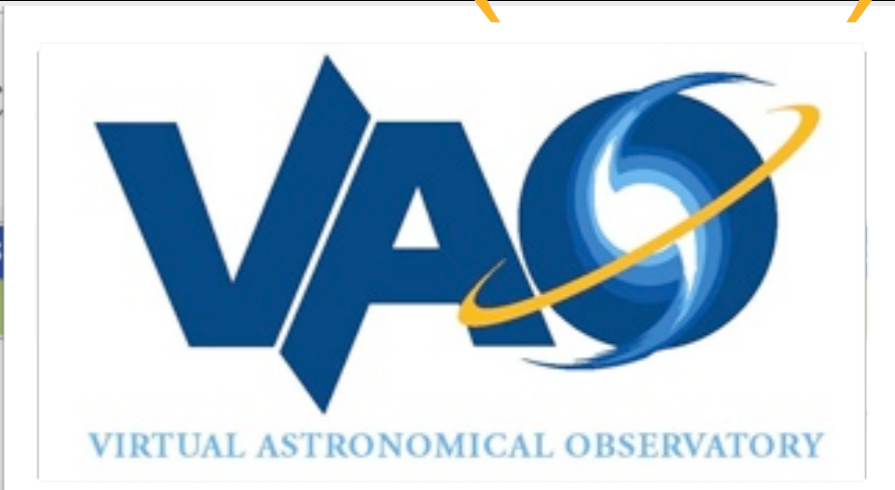
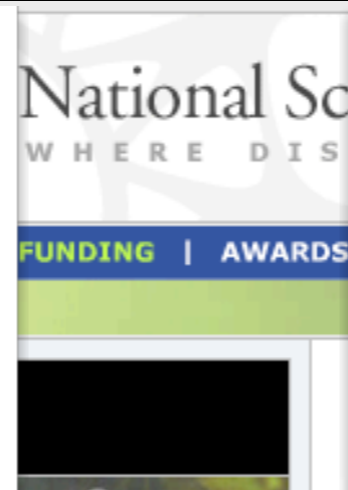
Alberto Accomazzi, Douglas Burke, Raffaele D'Abrusco, Rahul Davé, Christopher Erdmann, Pepi Fabbiano, Jay Luker, Gus Muench, Michael Kurtz & Alberto Pepe (Harvard-Smithsonian CfA); Eli Bressert (U. Exeter); Tim Clark (Massachusetts General Hospital/Harvard Medical School); Mercé Crosas (Harvard Institute for Quantitative Social Science); Chris Borgman (UCLA); Jonathan Fay & Curtis Wong (Microsoft Research)



The (US) Backstory

2001 2008 (2010)

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Proposal and Award Policies and Procedures Guide
Introduction
Proposal Preparation and

Management and Operation of the Virtual Astronomical Observatory

CONTACTS

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Nigel Sharp	nsharp@nsf.gov
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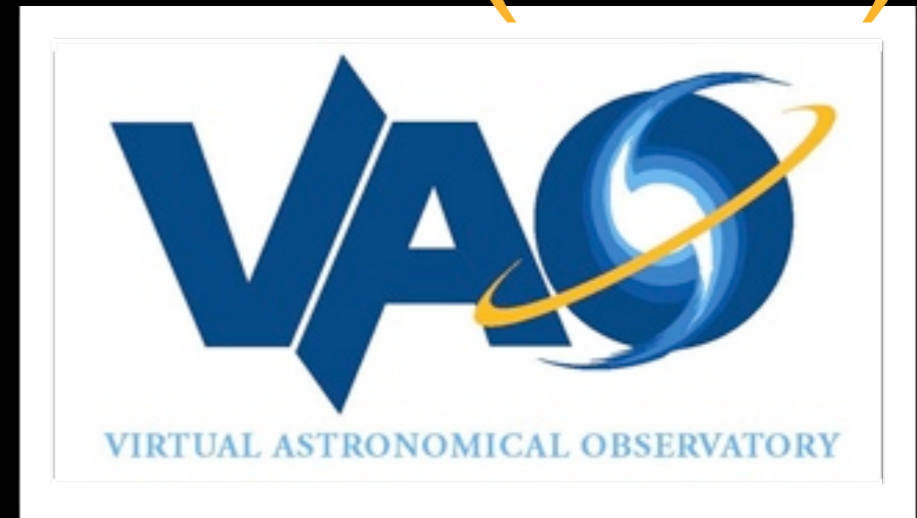
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Solicitation [08-537](#)

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and meanwhile...



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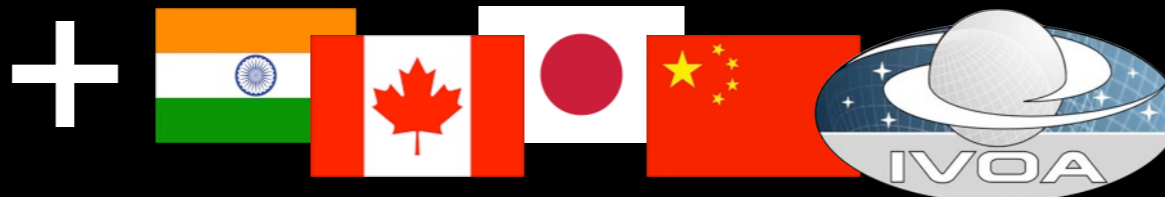
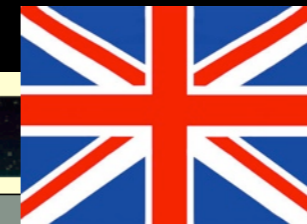
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AstroGrid Virtual Observatory Software for Astronomers

HOME INSTALL HELP SUPPORT

Welcome to AstroGrid

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



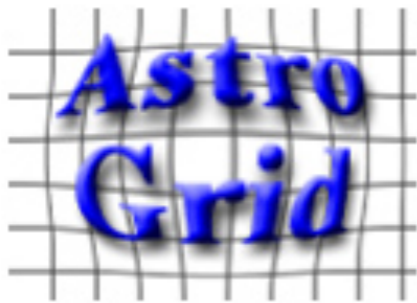
The Aladin Sky Atlas

Download Aladin on your machine | Start Aladin applet (fr - US - It - In - UK - Ca) | Jump to Aladin previewer

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

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



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From: Kayak Alert <alert@kayak.com>
 Subject: Your KAYAK Fare Alert: Boston (BOS) > Munich (MUC)
 Date: March 26, 2010 3:52:30 AM EDT
 To: Alyssa Goodman
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Instead, we are building an integrated "seamless" virtual observatory

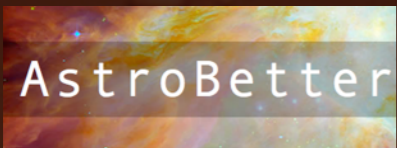


How?

Literature



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Blogs, Wikis, etc.

Data



“Registries”



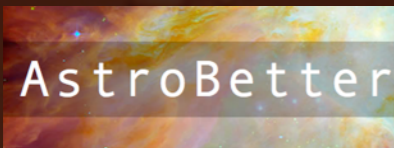
DataScope

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Literature

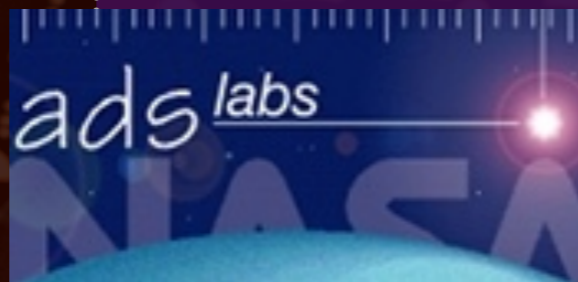


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WorldWide Telescope



TOPCAT



ds9



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"Registries"



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Literature



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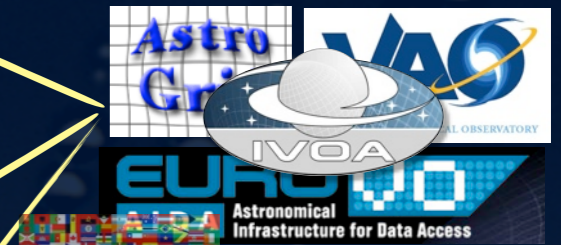
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SAMP

(Simple Application Messaging Protocol)

The image displays a composite screenshot of a Virtual Observatory (VO) environment. It features three main application windows:

- Aladin v6.0** (left): A multi-wavelength astronomical image of a star-forming region, labeled "DSS2.F.POSSII". It includes a menu bar (File, Edit, Image, Catalog, Overlay, Tool, View, Interop, Help) and a toolbar. A French flag is overlaid on the top right of this window.
- Microsoft WorldWide Telescope** (right): A virtual sky environment showing a star field with white circles highlighting specific objects. It has a menu bar (Explore, Guided Tours, Search, Community, View, Settings) and a Microsoft logo. An American flag is overlaid on the top right of this window.
- TOPCAT** (bottom center): A data analysis application window showing a "Scatter Plot" of red data points. It includes a menu bar (File, Export, Plot, Axes, Subsets, Errors, Marker Style, Error Style, Help) and a toolbar. A British flag is overlaid on the top right of this window.

At the bottom right of the WorldWide Telescope window, there is a control panel with a "Context Search Filter" (set to "1 of 1"), a celestial globe, and a map of the constellation Cepheus. The coordinates shown are RA: 21h01m16s and Dec: +68:08:31. The time is 00:14:04.

[link](#) to I2/2010 IVOA recommendation

Literature

"Seamless Astronomy" (Tools)

Data



Registries"



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Astronomy

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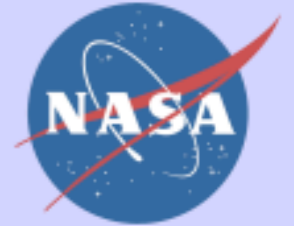
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- What people are reading
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The ADS is operated by the Smithsonian Astrophysical Observatory under NASA Grant NNX09AB39G
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ADS Labs/Seamless Astronomy Core Collaboration
 A. **Accomazzi**, A. Goodman, M. **Kurtz**, R. **Davé**, J. Luker, G. Muench, A. Pepe



zeeman effect ch - *Most recent*

Export to ADS Classic

Object: Other object [X] OR Nebula [X]

FILTER BY:

Authors

- Uitenbroek, H (4)
- Amano, T (2)
- Angel, J (2)
- Asensio Ramos, A (2)
- Balasubramaniam, K (2)



Keywords

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SIMBAD Objects

- Other object (3)
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NGC 7027 (1)

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[Aladin applet](#)

Vizier Tables

Refereed status

Dates

3. [2010ApJ...716L...1A](#) **The J = 1-0 Transitions of 12CH+, 13CH+, and 12CD+**
Amano, T.
The Astrophysical Journal Letters, Volume 716, Issue 1, pp. L1-L3 (2010). Jun 2010
4. [2009ApJ...705L.176S](#) **Detection of the Zeeman Effect in the 36 GHz Class I CH3OH Maser Line with the EVLA**
Sarma, A. P.; Momjian, E.
The Astrophysical Journal Letters, Volume 705, Issue 2, pp. L176-L179 (2009). Nov 2009
11. [2003A&A...412..513B](#) **The molecular Zeeman effect and diagnostics of solar and stellar magnetic fields. II. Synthetic Stokes profiles in the Zeeman regime**
Berdyugina, S. V.; Solanki, S. K.; Frutiger, C.
Astronomy and Astrophysics, v.412, p.513-527 (2003) Dec 2003
12. [2000PASP..112..873W](#) **Magnetism in Isolated and Binary White Dwarfs**
Wickramasinghe, D. T.; Ferrario, Lilia
The Publications of the Astronomical Society of the Pacific, Volume 112, Issue 773, pp. 873-924. Jul 2000

Explore

Guided Tours

Search

View

Settings

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1 of 1



WWT/Seamless Astronomy Core Collaboration

J. Fay (MSR), A. Goodman (CfA), G. Muench (CfA), C. Wong (MSR)

“shift-click”
on object



Finder Scope



Classification:
Planetary Nebula
in Cygnus

NGC7027

RA: 21h07m01s	Magnitude: 10.5
Dec: 42 : 14 : 10	Distance: n/a
Alt: -02 : 33 : 41	Rise: 23:50
Az: 342 : 18 : 46	Transit: 09:40
	Set: 19:35

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Info
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Research Show Object Close

Look At

Imagery

Sky

Digitized Sky Survey (Color)



Cygnus



NGC7027



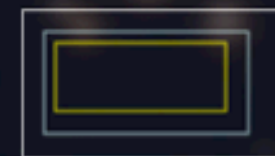
1 of 1



RA : 21h07m02s
Dec : 42:14:09

Cygnus

00:03:37



Done



NGC 7027



WorldWide Telescope

click
"Research,
Information"

Finder Scope



Classification:
Planetary Nebula
in Cygnus

NGC7027

RA:	21h07m01s	Magnitude:	10.5
Dec:	42 : 14 : 10	Distance:	n/a
Alt:	02 : 36 : 57	Rise:	23:50
Az:	042 : 29 : 00	Transit:	09:40
		Set:	19:35

- Name: NGC7027
- Information
- Imagery
- Virtual Observatory Searches
- Set as Foreground Imagery
- Set as Background Imagery
- Properties
- Copy Shortcut
- Share on Facebook



- 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

...more data

...or more literature



Look At: Sky

Imagery: Digitized Sky Survey (Color)




Cygnus NGC7027

1 of 1



ads labs

RA : 21h07m02s
Dec : 42:14:09



Literature



"Seamless Astronomy" (Tools)



SAMP



Data



Registries"



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“Seamless Astronomy” ...

astrometry.net + flickr + WWT

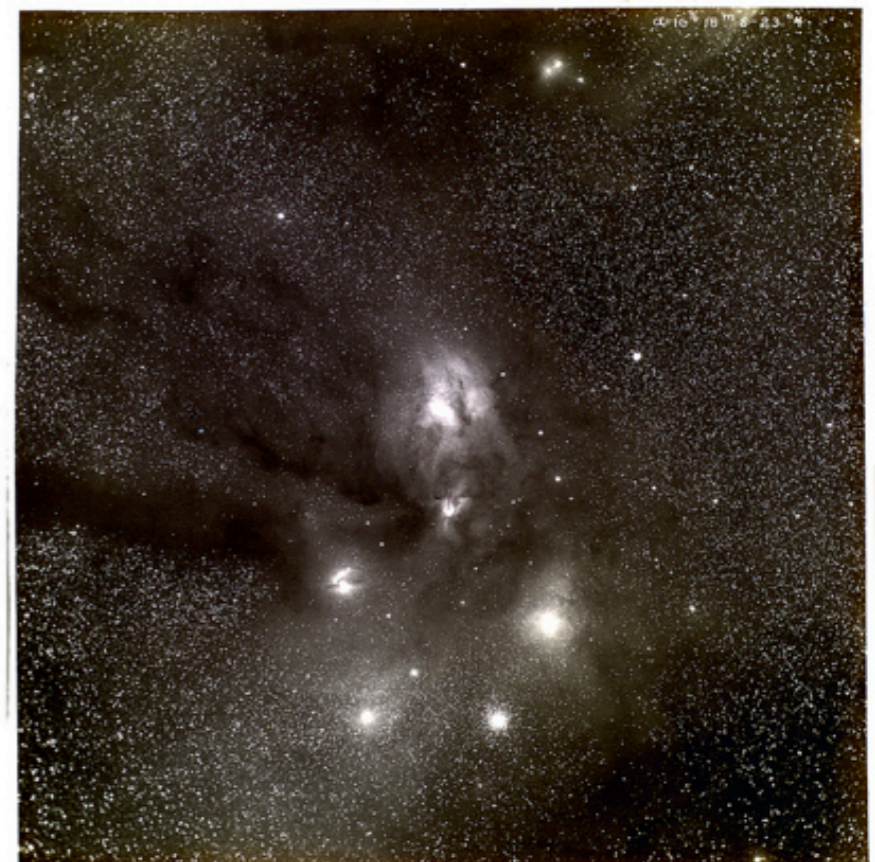


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Comments and faves **astrometry.net**

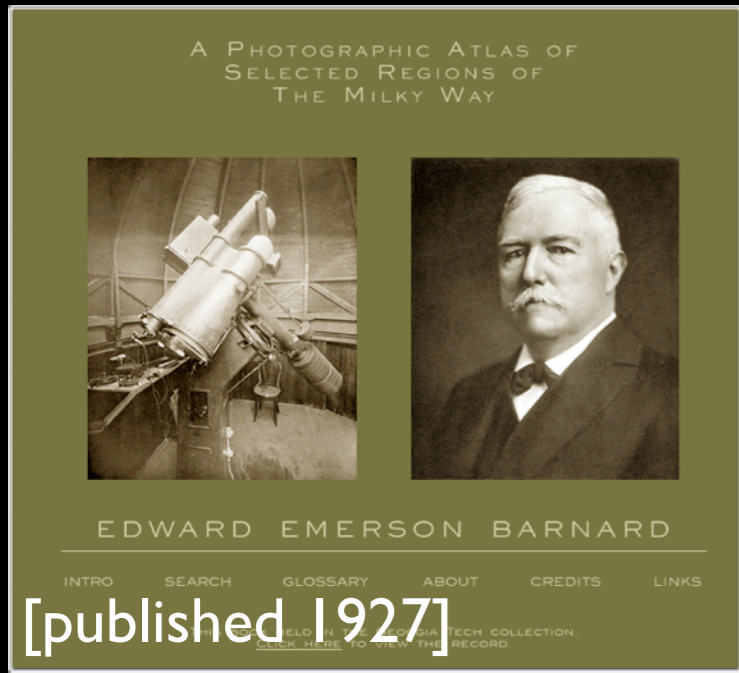
 astrometry.net (6 days ago | reply | delete)

Hello, this is the blind astrometry solver. Your results are:
 (RA, Dec) center:(246.421365149, -23.6749819397) degrees
 (RA, Dec) center (H:M:S, D:M:S):(16:25:41.128, -23:40:29.935)
 Orientation:178.34 deg E of N

Pixel scale:52.94 arcsec/pixel
 Parity:Reverse ("Left-handed")
 Field size :9.41 x 9.41 degrees

Your field contains:
 The star Antares (αSco)
 The star Graffias (β1Sco)
 The star Al Niyat (σSco)
 The star ιSco
 The star ω1Sco
 The star νSco
 The star ω2Sco
 The star ωOph
 The star 13Sco
 The star οSco
 IC 4592
 IC 4601
 NGC 6121 / M 4
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 IC 4604 / rho Oph nebula
 IC 4605

[View in World Wide Telescope](#)



Explore Guided Tours Search View Settings

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Look At Imagery Info Image Crossfade

1 of 3

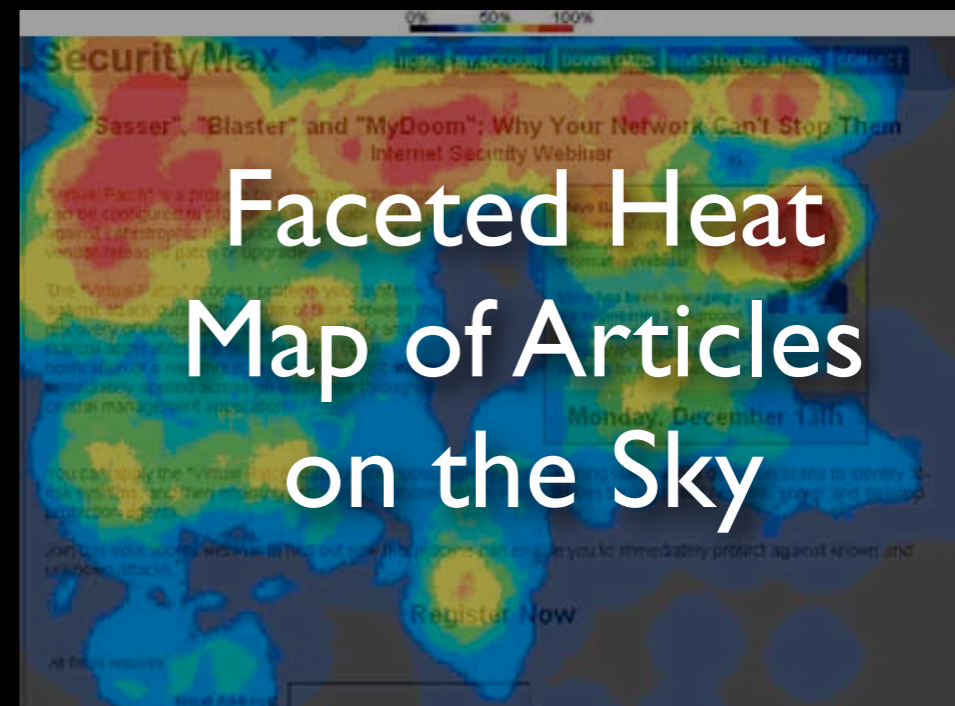
Ophiuchus 09:41:29

RA : 16h25m41s

Ophiuchus IC4634 IC4603 IC4604 M19 NGC6235 NGC6273 NGC6284

Coming (using astrometry.net++) in 2011...

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



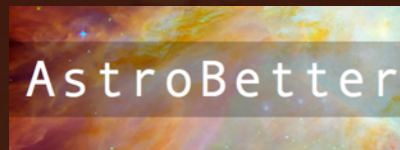
[e.g. ADS-CDS-WWT]

Collaborators: Alberto Accomazzi (CfA); Jonathan Fay (MSR); Alyssa Goodman (CfA); David Hogg (NYU); Gus Muench (CfA); Alberto Pepe (CfA)+advice from Pierre Fernique (CDS) & Thomas Bock (CDS)

Literature



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"Seamless Astronomy" (Tools)

LETTERS

NATURE | Vol 457 | 1 January 2009

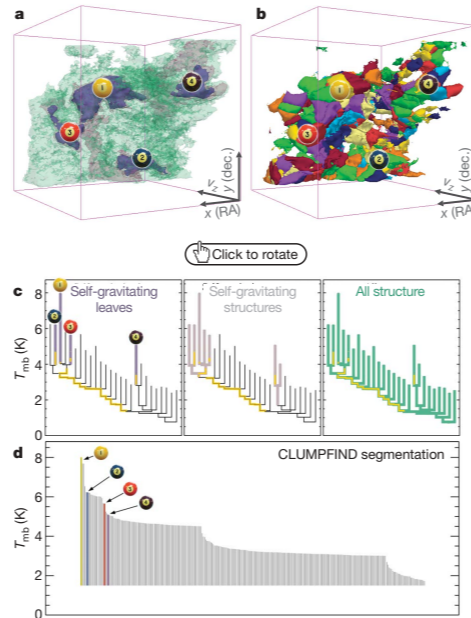


Figure 2 | Comparison of the 'dendrogram' and 'CLUMPFIND' feature-identification algorithms as applied to ^{13}CO emission from the L1448 region of Perseus. **a**, 3D visualization of the surfaces indicated by colours in the dendrogram shown in **c**. Purple illustrates the smallest scale self-gravitating structures in the region corresponding to the leaves of the dendrogram; pink shows the smallest surfaces that contain distinct self-gravitating leaves within them; and green corresponds to the surface in the data cube containing all the significant emission. Dendrogram branches corresponding to self-gravitating objects have been highlighted in yellow over the range of T_{mb} (main-beam temperature) test-level values for which the virial parameter is less than 2. The x - y locations of the four 'self-gravitating' leaves labelled with billiard balls are the same as those shown in Fig. 1. The 3D visualizations show position-position-velocity (p - p - v) space. RA, right ascension; dec., declination. For comparison with the ability of dendrograms (**c**) to track hierarchical structure, **d** shows a pseudo-dendrogram of the CLUMPFIND segmentation (**b**), with the same four labels used in Fig. 1 and in **a**. As 'clumps' are not allowed to belong to larger structures, each pseudo-branch in **d** is simply a series of lines connecting the maximum emission value in each clump to the threshold value. A very large number of clumps appears in **b** because of the sensitivity of CLUMPFIND to noise and small-scale structure in the data. In the online PDF version, the 3D cubes (**a** and **b**) can be rotated to any orientation, and surfaces can be turned on and off (interaction requires Adobe Acrobat version 7.0.8 or higher). In the printed version, the front face of each 3D cube (the 'home' view in the interactive online version) corresponds exactly to the patch of sky shown in Fig. 1, and velocity with respect to the Local Standard of Rest increases from front (-0.5 km s^{-1}) to back (8 km s^{-1}).

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 set⁸ 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'⁹ were proposed as a way to characterize clouds' hierarchical structure

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'¹⁰. Although well developed in other data-intensive fields^{11,12}, 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 frequency¹³.

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 iso-surfaces, such as radius (R), velocity dispersion (σ_v) and luminosity (L). The volumes can have any shape, and in other work¹⁴ 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 $X_{13\text{CO}} = 8.0 \times 10^{20} \text{ cm}^{-2} \text{ K}^{-1} \text{ s}$ (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 α_{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 fields¹⁶, its measured value should only be used as a guide to the longevity (boundedness) of any particular feature.

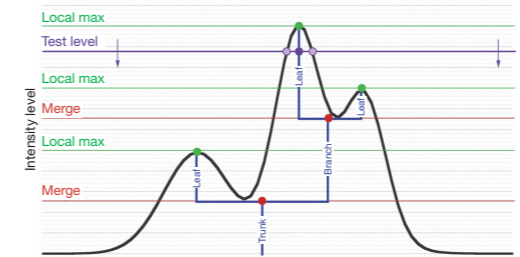


Figure 3 | Schematic illustration of the dendrogram process. Shown is the construction of a dendrogram from a hypothetical one-dimensional emission profile (black). The dendrogram (blue) can be constructed by 'dropping' a test constant emission level (purple) from above in tiny steps (exaggerated in size here, light lines) until all the local maxima and mergers are found, and connected as shown. The intersection of a test level with the emission is a set of points (for example the light purple dots) in one dimension, a planar curve in two dimensions, and an isosurface in three dimensions. The dendrogram of 3D data shown in Fig. 2c is the direct analogue of the tree shown here, only constructed from 'isosurface' rather than 'point' intersections. It has been sorted and flattened for representation on a flat page, as fully representing dendrograms for 3D data cubes would require four dimensions.

Data



"Registries"



DataScope

Disclaimer: This slide shows key excerpts from within the astronomy community & excludes more general s/w that is used, such as Papers, Zotero, Mendeley, EndNote, graphing & statistics packages, data handling software, search engines, etc.

Data in Literature

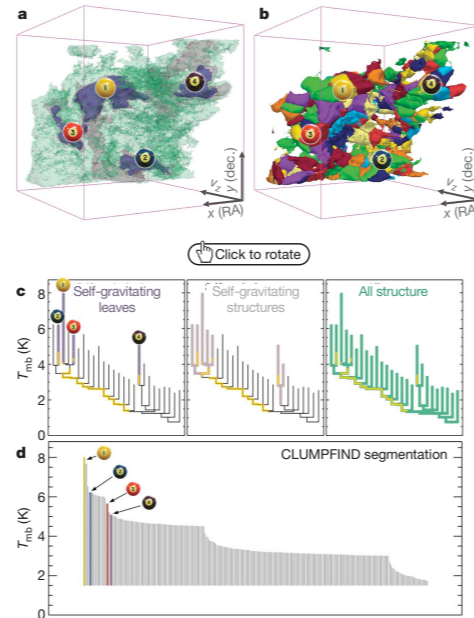


Figure 2 | Comparison of the 'dendrogram' and 'CLUMPFIND' feature-identification algorithms as applied to ^{13}CO emission from the L1448 region of Perseus. **a**, 3D visualization of the surfaces indicated by colours in the dendrogram shown in **c**. Purple illustrates the smallest scale self-gravitating structures in the region corresponding to the leaves of the dendrogram; pink shows the smallest surfaces that contain distinct self-gravitating leaves within them; and green corresponds to the surface in the data cube containing all the significant emission. Dendrogram branches corresponding to self-gravitating objects have been highlighted in yellow over the range of T_{mb} (main-beam temperature) test-level values for which the virial parameter is less than 2. The x - y locations of the four 'self-gravitating' leaves labelled with billiard balls are the same as those shown in Fig. 1. The 3D visualizations show position-position-velocity (p - p - v) space. RA, right ascension; dec., declination. For comparison with the ability of dendrograms (**c**) to track hierarchical structure, **d** shows a pseudo-dendrogram of the CLUMPFIND segmentation (**b**), with the same four labels used in Fig. 1 and in **a**. As 'clumps' are not allowed to belong to larger structures, each pseudo-branch in **d** is simply a series of lines connecting the maximum emission value in each clump to the threshold value. A very large number of clumps appears in **b** because of the sensitivity of CLUMPFIND to noise and small-scale structure in the data. In the online PDF version, the 3D cubes (**a** and **b**) can be rotated to any orientation, and surfaces can be turned on and off (interaction requires Adobe Acrobat version 7.0.8 or higher). In the printed version, the front face of each 3D cube (the 'home' view in the interactive online version) corresponds exactly to the patch of sky shown in Fig. 1, and velocity with respect to the Local Standard of Rest increases from front (-0.5 km s^{-1}) to back (8 km s^{-1}).

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 set⁸ 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'⁹ were proposed as a way to characterize clouds' hierarchical structure

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'¹⁰. Although well developed in other data-intensive fields^{11,12}, 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 frequency¹³.

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 iso-surfaces, such as radius (R), velocity dispersion (σ_v) and luminosity (L). The volumes can have any shape, and in other work¹⁴ 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 α_{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 fields¹⁶, its measured value should only be used as a guide to the longevity (boundedness) of any particular feature.

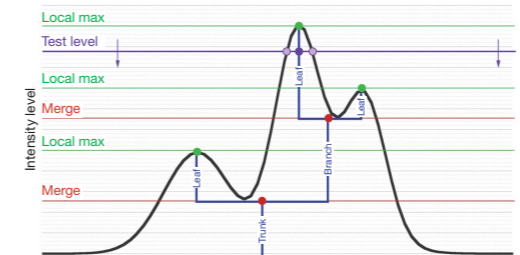


Figure 3 | Schematic illustration of the dendrogram process. Shown is the construction of a dendrogram from a hypothetical one-dimensional emission profile (black). The dendrogram (blue) can be constructed by 'dropping' a test constant emission level (purple) from above in tiny steps (exaggerated in size here, light lines) until all the local maxima and mergers are found, and connected as shown. The intersection of a test level with the emission is a set of points (for example the light purple dots) in one dimension, a planar curve in two dimensions, and an isosurface in three dimensions. The dendrogram of 3D data shown in Fig. 2c is the direct analogue of the tree shown here, only constructed from 'isosurface' rather than 'point' intersections. It has been sorted and flattened for representation on a flat page, as fully representing dendrograms for 3D data cubes would require four dimensions.

Note: This work came from the "AstroMed" project am.iic.harvard.edu



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Harvard Institute for Quantitative Social Science (Gary King, Mercé Crosas)
+ Seamless Astronomy Group, (Chris Erdmann, Alberto Pepe, Gus Muench et al.)

*But awareness is not high enough
...and skepticism is not hard to find.*

Good news is that the young & young at heart
are headed in the right direction.

Funding agencies have been slow to come along
...industrial collaboration is a better bet at present
(e.g. Microsoft Research/WorldWide Telescope).



data links

ADS may be our "way in" via killer apps

The screenshot displays the ADS Labs interface for a search on "magnetic fields in molecular clouds". The top navigation bar includes "Home", "Labs Home", "ADS Classic", "Help", and "Sign on". The search results are listed on the left, with the top entry being "1999ApJ...520..706C Magnetic Fields in Molecular Clouds: Observations Confront Theory" by Crutcher, Richard M. An orange arrow points from the "View as network" button to the "Author network" button in a dropdown menu.

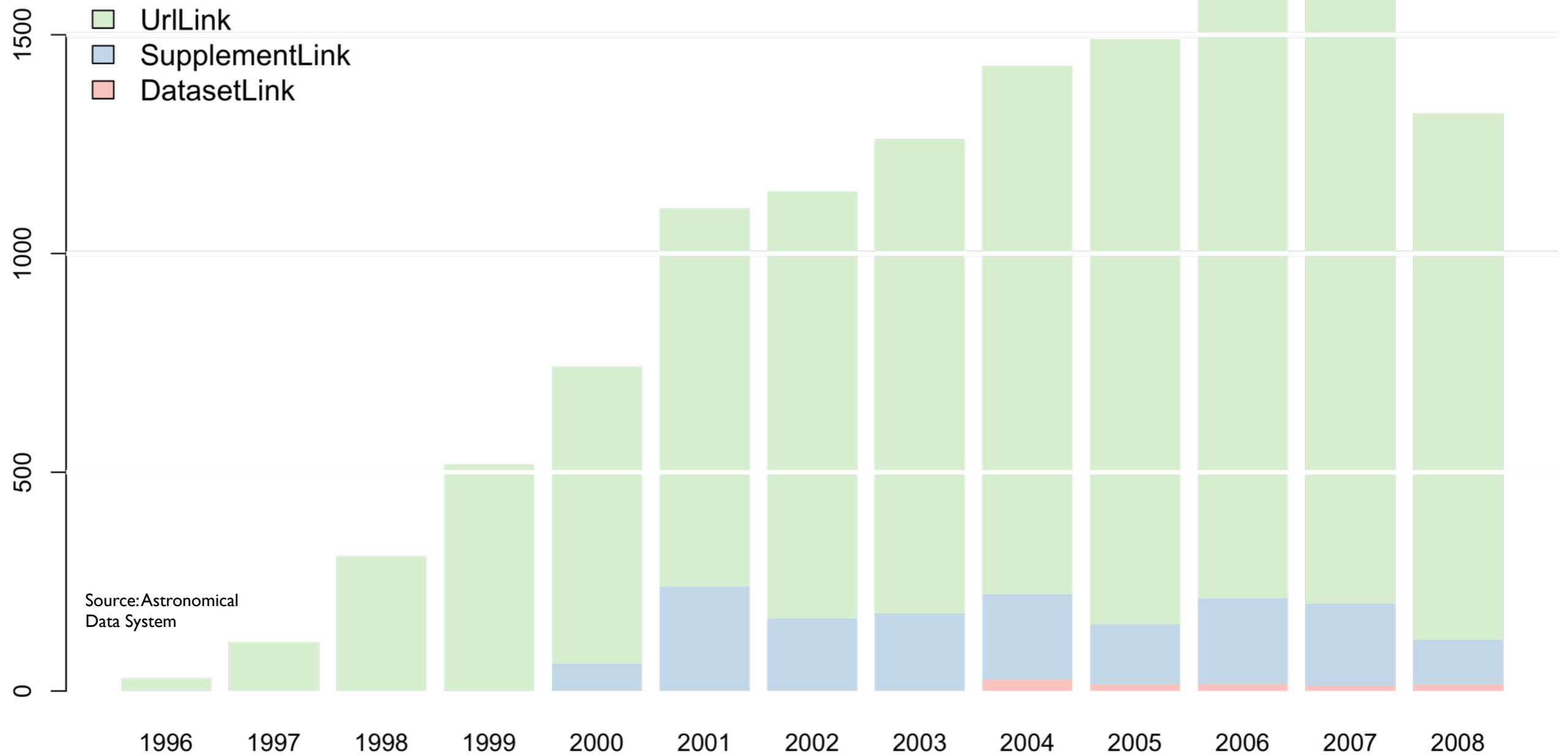
Below the search results, there are controls for "Selection type" (set to "Neighbors (shift+alt)") and "Filter by author weight" (ranging from min to max). A "View papers for selected authors" button is also present.

The main visualization is an author network graph. Nodes represent authors, and edges represent connections between them. The graph shows a dense network of authors, with some nodes highlighted in yellow. The authors included in the network are: Nakamura, F; Mouschovias, T; Troland, T; Matthews, B; Helle, C; Crutcher, R; Heyer, M; Ostriker, E; Kazes, I; Goodman, A; Kirby, L; Houde, M; Li, H; Vaynshteyn, L; Ward-Thompson, D; Vaillancourt, J; Dowell, C; Stone, J; McKee, C; Andre, P; Hildebrand, R; Klessen, R; Mac Low, M; Norman, M; Feigelson, E; Vazquez-Semadeni, E; Kim, J; Heitsch, F; Ballesteros-Paredes, J; Pudritz, R; Padoan, P; and Nordlund, A.

At the bottom of the interface, there is a "Dates" filter and a "Author network" button. The text "IN: Annual review of astronomy and astrophysics. Volume 27 (A90-29983 12-90). Palo Alto, CA, Annual Reviews, Inc. 1989" is visible at the bottom right.

DATA IN “LITERATURE”

NUMBER OF ASTRONOMY PUBLICATIONS WITH LINKS, BY YEAR (ADS)





Welcome! This website provides a platform for sharing resources, workflows, and basic organizational information about networked tools, websites and databases in astronomy. Its intended audience is any scientist performing astronomical research online. It originated from the activities of scientists at the Harvard Smithsonian Center for Astrophysics in Cambridge, MA.

By online astronomy, we mean all forms of networked tools, databases and websites that are utilized for astronomical research, including scholarly discourse and social interactions through blogs, forums and other web media.

By *user group*, we mean a group of individuals who meet approximately monthly to discuss their solutions and problems with doing their research online.

Blog

[Research Blogs, Forums and Q&A websites](#) Our January 25, 2011 meeting topic will be "Research Blogs, Forums and Q&A websites." We will hold an open discussion on how everyone uses these tools in their everyday ...
Posted Jan 23, 2011 9:11 PM by August Muench

[Expo of Online Astronomy tools \(aka, a VO expo\)](#) We are holding our "VO Expo" tomorrow morning (1 Dec, 9am-noon) in Phillips Auditorium. We will be covering the role of the CfA VO User group for scientists (and ...
Posted Dec 15, 2010 9:34 AM by August Muench

[ADASS Day 1: A new portal, new Aladin features](#) Monday was the first full day of the Astronomical Data Analysis Software and Systems 2010 meeting. As there are new tools being presented and demo'd, I'm going to ...
Posted Nov 9, 2010 7:09 PM by August Muench

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15
days since
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The figure (above) diagrams the relationship between astronomical research and the data and literature sources that the research draws upon. The researcher stands between the literature and data, taking information from each, integrating their

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



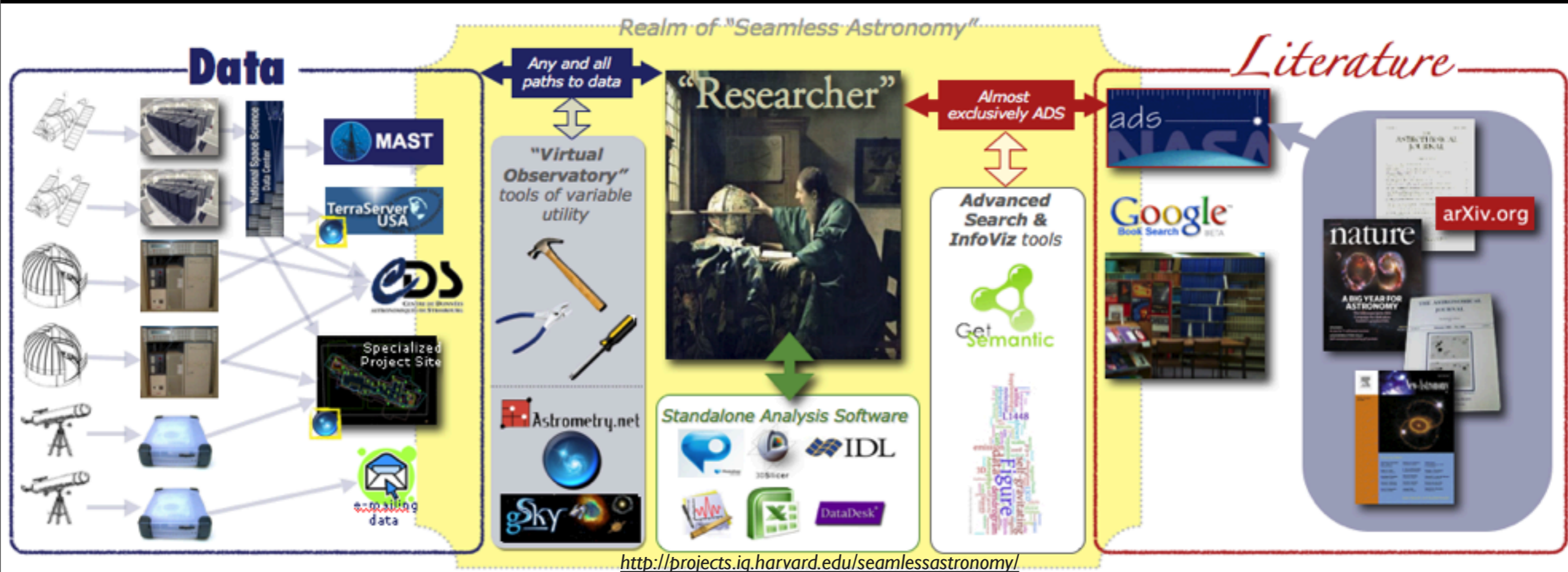
Kiva model: WWT Partners & “VAO Associates”

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.

Seamless Astronomy

projects.iq.harvard.edu/seamlessastronomy



Alyssa A. Goodman
 Harvard-Smithsonian Center for Astrophysics



with

Alberto Accomazzi, Douglas Burke, Raffaele D'Abrusco, Rahul Davé, Christopher Erdmann, Pepi Fabbiano, Jay Luker, Gus Muench, Michael Kurtz & Alberto Pepe (Harvard-Smithsonian CfA); Eli Bressert (U. Exeter); Tim Clark (Massachusetts General Hospital/Harvard Medical School); Mercé Crosas (Harvard Institute for Quantitative Social Science); Chris Borgman (UCLA); Jonathan Fay & Curtis Wong (Microsoft Research)

Planet Hunters

Using public data from NASA's Kepler mission, we are looking for planets around other stars.

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- GALAXY ZOO HUBBLE
- oldWeather

The Milky Way Project

The Milky Way Project aims to sort and measure our galaxy, the Milky Way. Initially we're asking you to help us find and draw bubbles in beautiful infrared data from the Spitzer Space Telescope.

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Old Weather

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JOIN IN



Moon Zoo

Explore the Moon in unprecedented detail using images from NASA's Lunar Reconnaissance Orbiter.



“Citizen Science”

EN · The Milky Way Project is part of the ZOO NIVERSE

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