Panel Discussion presentation: "Astroinformatics: Linking Scientific Data and Publications"

Alberto Pepe
Harvard University

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ASTROINFORMATICS
Linking scientific data and publications
U.C.L.A. ➔ HARVARD
VisIVO: Visualization Interface to the Virtual Observatory
CS 171 Visualization

The amount and complexity of information produced in science, engineering, business, and everyday human activity is increasing at staggering rates. The goal of this course is to expose you to visual representation methods and techniques that increase the understanding of complex data. Good visualizations not only present a visual interpretation of data, but do so by improving comprehension, communication, and decision making.

In this course you will learn how the human visual system processes and perceives images, good design practices for visualization, tools for visualization of data from a variety of fields, collecting data from web sites with Python, and programming of interactive visualization applications using Processing.

CS 171 Preview by Miriah Meyer
U.C.L.A. ➔ HARVARD
Center for Embedded
Networked Sensing

Center for Astrophysics
CENTER FOR EMBEDDED NETWORK SENSING

“We envision a world where researchers, students, industry and government routinely use distributed sensor and actuator networks to understand and control both natural and artificial systems to reveal previously unobservable phenomena”

NSF Science & Technology Center (est. 2002) with 300+ researchers in Computer Science, Electrical Engineering, Statistics, Biology, Environmental Science, Urban Planning, Sociology, Media, at 5 institutions: UCLA, USC, Caltech, UC Merced, UC Riverside
CENTER FOR ASTROPHYSICS

The Center for Astrophysics combines the resources and research facilities of the Harvard College Observatory and the Smithsonian Astrophysical Observatory under a single director to pursue studies of those basic physical processes that determine the nature and evolution of the universe.

Co-funded by the Harvard College Observatory and the Smithsonian Astrophysical Observatory (est. 1973). 300+ researchers in six research divisions: Atomic and Molecular Physics; High Energy Astrophysics; Optical and Infrared Astronomy; Radio and Geoastronomy; Solar, Stellar, and Planetary Sciences; and Theoretical Astrophysics. The center also has an active science education and outreach initiative.
CENS

Little science
Multi-disciplinary
Multi-institution

CFA

Big science
Mono-disciplinary (?)
Single physical location, but based on global collaboration
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CENS

Little science
Multi-disciplinary
Multi-institution
Sensors
Mega/Giga-bytes
Institutional data repositories
Institutional digital library

CFA

Big science
Mono-disciplinary (?)
Single physical location, but based on global collaboration
Telescopes
Tera/Peta-bytes
Survey- or telescope-based repositories (e.g., Chandra, SDSS)
Domain-specific, interoperable digital library (i.e., ADS)
ASTROINFORMATICS
How astronomers store, access, discover, and cite scientific data
1 DATA CITATION PRACTICES

The need for a standardized, widely-adopted mechanism to cite data in a structured format
THE COMPLETE SURVEY OF OUTFLOWS IN PERSEUS

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ABSTRACT

We present a study on the impact of molecular outflows in the Perseus molecular cloud complex using the COMPLETE Survey large-scale $^{12}$CO(1–0) and $^{13}$CO(1–0) maps. We used three-dimensional isosurface models generated in right ascension–declination–velocity space to visualize the maps. This rendering of the molecular line data allowed for a rapid and efficient way to search for molecular outflows over a large ($\sim$16 deg$^2$) area. Our outflow-searching technique detected previously known molecular outflows as well as new candidate outflows. Most of these new outflow-related high-velocity features lie in regions that have been poorly studied before. These new outflow candidates more than double the amount of outflow mass, momentum, and kinetic energy in the Perseus cloud complex. Our results indicate that outflows have significant impact on the environment immediately surrounding localized regions of active star formation, but lack the energy needed to feed the observed turbulence in the entire Perseus complex. This implies that other energy sources, in addition to protostellar outflows, are responsible for turbulence on a global cloud scale in Perseus. We studied the impact of outflows in six regions with active star formation within Perseus of sizes in the range of 1–4 pc. We find that outflows have enough power to maintain the turbulence in these regions and enough momentum to disperse and unbind some mass from them. We found no correlation between outflow strength and star formation efficiency (SFE) for the six different regions we studied, contrary to results of recent numerical simulations. The low fraction of gas that potentially could be ejected due to outflows suggests that additional mechanisms other than cloud dispersal by outflows are needed to explain low SFEs in clusters.

Key words: ISM: clouds – ISM: individual objects (Perseus) – ISM: jets and outflows – ISM: kinematics and dynamics – stars: formation – turbulence

Online-only material: color figures
in IC 348 (HD 281159) is confirmed to reside in the Perseus cloud, but there might be a few other high-mass stars that interact with the cloud (via shocks). The cloud structure and kinematics can be used to identify molecular outflows, which are known to be associated with young stellar objects (YSOs), providing insight into the process of star formation.

To study the impact of these energetic phenomena on the cloud, we used the 3D Slicer, which was developed originally at the MIT Artificial Intelligence Laboratory and the Surgical Planning Lab at Brigham and Women's Hospital. It was designed to help surgeons in image-guided surgery, to assist in pre-surgical preparation, to be used as a diagnostic tool, and to help in the field of brain research and visualization (Gerring 1999). The 3D Slicer was first used with astronomical data by Borkin et al. (2005) to study the hierarchical structure of star-forming cores and velocity structure of IC 348. The CO(1–0) and CO(1–0) data were obtained using a digital correlator providing a total bandwidth of 25 MHz.

We divided the Perseus cloud into six areas (with similar cloud central LSR velocity) and searched for high-velocity points found in 3D Slicer (see below). The boundaries of these areas are similar to those used by Pineda et al. (2008), who also based their division mainly on the cloud’s central LSR velocity. The regions, whose outlines are shown in Figure 1, overlap between 1 and 3 arcmin to guarantee complete analysis. This overlap was checked to be sufficient based on the fact that faint and known outflows which crossed regions were successfully double-identified.

For each area, an isosurface (constant intensity level) map was generated in 3D Slicer, using the 12CO(1–0) line. The threshold emission intensity level chosen for each isosurface map was the lowest level giving a complete visualization. The high-velocity gas in this three-dimensional space can be identified in the form of spikes, as shown for the B5 region in Figure 2, which visually stick out from the general distribution of the gas. These sharp protrusions occur since one is looking at the radial velocity component of the gas along the line of sight, thus causing spikes wherever there is gas at distinct velocities far away from the main cloud velocity. Instead of having to go through each region and carefully examine each channel map, or randomly scroll through the spectra by hand, this visualization allows one to instantly see where the high-velocity points are located (see also Borkin et al., 2007, 2008).

3. COMPUTATIONAL MOTIVATION AND THREE-DIMENSIONAL VISUALIZATION

This study allows for a test of the effectiveness of three-dimensional visualization of molecular line data of molecular clouds in R.A.–decl.–velocity (p–p–1) space as a way to identify velocity features, such as outflows, in large maps. The primary program used for three-dimensional visualization is 3D Slicer which was developed originally at the MIT Artificial Intelligence Laboratory and the Surgical Planning Lab at Brigham and Women’s Hospital. It was designed to help surgeons in image-guided surgery, to assist in pre-surgical preparation, to be used as a diagnostic tool, and to help in the field of brain research and visualization (Gerring 1999).

4. OUTFLOW IDENTIFICATION

A total of 218 high-velocity points were visually identified in 3D Slicer for all of Perseus in 12CO. We checked the position of each high-velocity point against the locations of known outflows (based on an extensive literature search) to determine if the point is associated with any known molecular outflows. From the 218 high-velocity points found, a total of 36 points were identified as associated with known molecular outflows. Figure 3 shows the approximate regions where previously known 12CO outflow candidates were found. The number of high-velocity points associated with a single outflow varies depending on its size and intensity. For example, the parsec-scale B5 IRS1 outflow is a conglomerate of six high-velocity points whereas the HH 211 outflow, which is only ~0.1 pc long, is identified by only one point. We inspected each of the remaining high-velocity points to verify whether they are outflow related or caused by other velocity features in the cloud. To determine if a high-velocity point is outflow related, we checked the spectrum by eye to look for outflow traits (e.g., high-velocity low-intensity wings) and verified its proximity to known outflows and outflow sources (Wa et al. 2004), HH objects (Walawender et al. 2005b), H3 knots (Davis et al. 2008), and candidate young stellar objects (YSOs) from the c2d Spitzer survey (Evans et al. 2009) and other known outflow sources and YSOs. We also checked the velocity distribution and gas association of the high-velocity point to verify whether the velocity and structure of the gas were significantly different from that of the cloud in that region. From the remaining 182 high-velocity points found, a total of 60 points were classified as being outflow candidates based on the criteria mentioned above. For 97% of these outflow candidates, the maximum velocity away from the cloud velocity is equal or greater than the escape velocity in that region of the cloud. We note that we purposely chose not to be too restrictive in the definition of outflow candidate (e.g., we identified outflow candidates even without a solid outflow source identification, see Table 1).

Below, using our broad, yet realistic, definition we can calculate the maximum possible impact from all plausible molecular outflows to the cloud. Out of the remaining 122 points, 17 points were discarded due to too much noise or being pixels cut off by the map’s edge and the other 105 points are thought to be caused by a number of other kinetic phenomena, including smooth clouds at other velocities in the same line of sight unrelated to the Perseus cloud and spherical winds from young stars that produce expanding shell-like structures in the molecular gas (as opposed to the discrete blob morphology observed in the 60 outflow candidates). The distribution and impact of these expanding shells on the cloud will be discussed further in a subsequent paper (H. G. Arce et al., 2011, in preparation).

We visually inspected the velocity maps in the area surrounding each of the 60 high-velocity points identified as being a high-velocity feature (but unrelated to known outflows) and chose an area (in R.A., decl. space) and velocity range that included all or most of the emission associated with the kinetic feature. The integration area and velocity ranges were conservatively chosen to include only the emission visibly associated with the velocity features in the Hα imaging material, thus avoiding cloud emission. The high-velocity gas associated with these 60 points shows discrete morphologies in area and velocity. However, because the high-velocity features are referred as a “COMPLETE Perseus Outflow Candidate” (CPOC) and we list their positions and other properties in Table 2, a Figure 4, we show the velocity ranges of outflow candidates in comparison with their local LSR velocity.

Our outflow-detection technique proved to be reliable, as we detect high-velocity gas associated with all published CO(1–0) outflows (see Figure 3). However, it is very probable that the catalog of new molecular outflows generated for this paper is an underestimate of the true number of previously undiscovered molecular outflows due to the resolution of the CO maps and other limitations of our outflow-detection technique. Some of these high-velocity features are outflows that are smaller than the beam size of our map (i.e., 0.06 pc at the assumed distance of Perseus) that, to this moment, might be outflows that are associated with the positions of known outflows. The high-velocity features that are unrelated to known outflows might be identified by the map’s edge and the other 105 points are thought to be caused by a number of other kinetic phenomena, including smooth clouds at other velocities in the same line of sight unrelated to the Perseus cloud and spherical winds from young stars that produce expanding shell-like structures in the molecular gas (as opposed to the discrete blob morphology observed in the 60 outflow candidates). The distribution and impact of these expanding shells on the cloud will be discussed further in a subsequent paper (H. G. Arce et al., 2011, in preparation.).
in IC 348 (BD 281159) is confirmed to reside in the Perseus cloud, but there might be a few other high-mass stars that interact with their wind (and/or UV radiation) even though they were not necessarily formed in the cloud complex (see, e.g., Walmsley et al. 2004; Rudge et al. 2002; Kirk et al. 2001a, 2001b). There is also a large number of nebulous objects associated with outflow shocks (i.e., HH objects and H2 knots) that have been identified in the cloud complex (Bally et al. 1999; Yura & Hardee 1999; Walmsley et al. 2005; Davis et al. 2005).

The whole Perseus region was first surveyed in CO by Savage et al. (1975) and since then has been mapped in CO at different angular resolutions (all with beams ≳ 1”) by a number of other authors (e.g., Bachiller & Cernicharo 1986; Ungerechts & Thaddeus 1987; Padoan et al. 1999; Sinn 2006). These maps show a clear velocity gradient in the Perseus molecular cloud complex where the central cloud (LSR velocity increases from about 4.5 km s\(^{-1}\)) at the western edge of the cloud to about 10 km s\(^{-1}\) at the eastern end. The large velocity gradient in the gas across the entire complex and the fact that different parts of the Perseus cloud appear to have different distances (as above) could possibly indicate that the complex is made up of a superposition of different entities. Recently, the Perseus molecular cloud complex was also observed (and studied) in its entirety in the mid- and far-infrared as part of the “From Molecular Cores to Planet-forming Disks” Untersuchung Projekt (Jörgensen et al. 2006; Rebull et al. 2007; Evans et al. 2009).

2. DATA

In this paper, we use the \(^12\)C(1-0) and \(^12\)CO(1-0) data collected for Perseus as part of the COrlated Molecular Probe 10

10 See http://www.cfa.harvard.edu/COMPLETE/projects/outflows.html for a link to the molecular line maps.

6 See http://www.cfa.harvard.edu/COMPLETE.

7 See http://www.cfa.harvard.edu/COMPLETE/projects/outflows.html for a link to the molecular line maps.

8 This work is done as part of the Astronomical Medicine project (http://www.amh.org). The material is housed in the Department of Radiology at Harvard (http://sca.harvard.edu). The goal of the project is to provide common research challenges and high-quality pixel and image analysis and accessibility of large volumes of data.

9 See http://www.cfa.harvard.edu/COMPLETE.

10 See http://www.cfa.harvard.edu/COMPLETE/projects/outflows.html for a link to the molecular line maps.

11 For more detailed information on the origin of the \(^13\)CO or the \(^13\)CO data, and on the methods used to determine the velocity field, see the original paper by Rebull et al. (2007).

12 See http://www.cfa.harvard.edu/COMPLETE.

13 See http://www.cfa.harvard.edu/COMPLETE/projects/outflows.html for a link to the molecular line maps.

14 Based on the current data, we cannot determine the velocity field of the outflows in this region of the cloud. However, we note that the velocity field of the outflows is consistent with the velocity field of the \(^13\)CO data. This suggests that the outflows are associated with the \(^13\)CO data.

15 Based on the current data, we cannot determine the velocity field of the outflows in this region of the cloud.
CITATIONS TO DATA: UNSCRUTIRED

CITATIONS TO PAPERS: SCRUTIRED

ALBERTO PEPE
APEPE@CFAR.HARVARD.EDU ALBERTOPEPE

20
How were scientists citing literature before a standardized referencing mechanism was in place?

Footnotes?
Inline referencing?
Works identified by author, year, title?
How were scientists citing literature before a standardized referencing mechanism was in place?

Footnotes?
Inline referencing?
Works identified by author, year, title?

The use of hyper-linking and other ad-hoc methods to reference data are comparable to early attempts to cite scientific literature.
LINK ANALYSIS

Similar to bibliometric analyses, but let us look at references to data rather than references to literature
NUMBER OF LINKS IN ASTRONOMY PUBLICATIONS*, BY YEAR

NUMBER OF ASTRONOMY PUBLICATIONS WITH LINKS, BY YEAR

Source: Astronomical Data System
NUMBER OF ASTRONOMY PUBLICATIONS WITH LINKS, BY YEAR

Source: Astronomical Data System
### MOST FREQUENT BASE URLs OF LINKS IN ASTRONOMICAL PUBLICATIONS

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Source: Astronomical Data System
HTTP STATUS CODES OF LINKS IN ASTRONOMICAL PUBLICATIONS

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Source: Astronomical Data System
The need for a “personal” or project-based repository for “small” astronomical data
in IC 348 (HD 281159) is confirmed to reside in the Perseus cloud, but there might be a few other high-mass stars that introduces to the cloud through their winds and (or UV radiations) even though they were not necessarily formed in the cloud complex (see, e.g., Watanen et al. 2004; Ridge et al. 2006; Kirk et al. 2007). There is also a large number of nebulous objects associated with outflow shocks (i.e., HII objects and H2 knots) that have been identified in the cloud complex (Keto et al. 2003; Yura et al. 1993; Walch et al. 2007b; Davis et al. 2003).

The whole Perseus region was first surveyed in 12CO by Saglia et al. (1974) and since then has been mapped in CO at different angular resolutions (all with beams > 1") by a number of other authors (e.g., Bachiller & Combes 1986; Ungerechts & Thaddeus 1987; Paoli et al. 1991; Sinn et al. 2000). These maps show a clear velocity gradient in the Perseus molecular cloud complex where the central cloud (L34) velocity increases from about 4.5 km/s at the western edge of the cloud to about 10 km/s at the eastern end. The large velocity gradient in the gas across the entire complex and the fact that different parts of the Perseus cloud appear to have different distances (see above) could possibly indicate that the complex is made up of a superposition of different entities. Recently, the Perseus molecular cloud complex was also observed and studied in its entirety in the mid- and far-infrared as part of the "From Molecular Cores to Planet-forming Disks" (FMCPSD) Spitzer Legacy Project (Jørgensen et al. 2006; Rebull et al. 2007; Evans et al. 2009).

In this paper, we use the 12CO(1-0) and 13CO(1-0) data collected for Perseus as part of the Coordinated Molecular Probe Survey of the Oort Cloud (CMOMPSC) with a 10.5" beam telescope at these frequencies is about 46". Both maps of 12CO(1-0) and 13CO(1-0) were obtained by spectral line observations with a 10.5" beam telescope at these frequencies and provided the information needed to study the impact of these energetic phenomena on the cloud. The 12CO(1-0) and 13CO(1-0) maps of the Perseus cloud are in the form of spatial maps and were used to probe the cloud structure and kinematics. Observations were made in 100-150 maps with an effective velocity resolution of 0.7 km s⁻¹. These small maps were then reassembled to form the final large map of Perseus, which is about 6.5 x 5.5°. Calibration was done via the chopping technique (Kaneko & Ulich 1984) and the spectra with unit of Hz were smoothed to a spectral resolution of 3 km s⁻¹.

To the best of our knowledge, this is the first time high-resolution maps of H2 knots in the cloud have been published. The high-resolution maps of H2 knots in the cloud are important for understanding the structure and dynamics of the cloud. The high-resolution maps of H2 knots in the cloud also provide valuable information about the formation and evolution of star-forming regions. The high-resolution maps of H2 knots in the cloud can be used to study the effects of massive stars on the surrounding gas and to understand the role of these stars in triggering star formation. The high-resolution maps of H2 knots in the cloud can also be used to study the properties of the gas and dust in the cloud, such as the mass, temperature, and composition. These properties can be used to study the evolution of the cloud and to understand the role of the cloud in the larger-scale structure of the galaxy. The high-resolution maps of H2 knots in the cloud can also be used to study the interaction between the gas and dust in the cloud and the surrounding environment, such as the influence of the Galactic Center on the cloud.
**Project Description**

The COordinated Molecular Probe Line Extinction Thermal Emission Survey of Star Forming Regions (COMPLETE) provides a range of data complementary to the Spitzer Legacy Program "From Molecular Cores to Planet Forming Disks" (c2d) for the Perseus, Ophiuchus and Serpens regions. In combination with the Spitzer observations, COMPLETE will allow for detailed analysis and understanding of the physics of star formation on scales from 500 A.U. to 10 pc.

**Phase I**, which is now complete, provides fully sampled, arcminute resolution observations of the density and velocity structure of the three regions, comprising: extinction maps derived from the Two Micron All Sky Survey (2MASS) near-infrared data using the NICER algorithm; extinction and temperature maps derived from IRAS 60 and 100μm emission; HI maps of atomic gas; 12CO and 13CO maps of molecular gas; and submillimeter continuum images of emission from dust in dense cores.

Click on the "Data" button to the left to access this data.

**Phase II** (which is still ongoing) uses targeted source lists based on the Phase I data, as it is (still) not feasible to cover every dense star-forming peak at high resolution. Phase II includes high-sensitivity near-IR imaging (for high resolution extinction mapping), mm-continuum imaging with MAMBO on IRAM and high-resolution observations of dense gas tracers such as N2H+. These data are being released as they are validated.

**COMPLETE Movies:** Check-out our movies page for animations of the COMPLETE data cubes in 3D.

**Referencing Data from the COMPLETE Survey**

COMPLETE data are non-proprietary. Please reference Ridge, N.A. et al., "The COMPLETE Survey of Star Forming Regions: Phase I Data", 2006, AJ, 131, 2921 as the data source. However, we would like to keep a record of work that is using COMPLETE data, so please send us an email (with a reference if possible) if you make use of any data provided here.

**Recent COMPLETE Publications**

NEW Helen Kirk, Jaime E. Pineda, Doug Johnstone, and Alyssa A. Goodman, 2010, The Dynamics of Dense Cores in the Perseus Molecular Cloud II: The Relationship Between Dense Cores and the Cloud, Accepted to ApJ. (astro-ph | ADS)


2MASS/NICER Perseus Extinction Data

Description:
Extinction maps made from 2MASS and NICER (Near Infrared Extinction-method Revisited). This map is made from the final 2MASS data release and covers all of Perseus. The data values are magnitudes of visual extinction (A_v). Consult the error map and stellar density map to identify any problematic regions (few in this map). Versions in galactic and equatorial coordinates are provided. The equatorial versions look less smooth, since they were regridded without re-orientating pixels. FITS headers for all these files occasionally refuse to play nicely with certain programs, but all display correctly in something like DS9.

Contact Person: Jonathan Foster, Harvard-Smithsonian Center for Astrophysics

Telescopes: 2MASS
Status: Finished

Sampling: N/A

Areal Coverage: 9 by 12 degrees

Map Center (Galactic):
l = 159.90
b = -20.73

Map Center (J2000):
RA = 03:33:55
Dec = 30:14:27

Comments on Resolution:
The map is smoothed with a gaussian filter with FWHM = 5 arcminutes or two pixels, so each pixel is 2.5 arcminutes.

Downloads:
- PerA_Ext2MASS_F_Gal.fits Map in Galactic Coordinates (436 K)
- PerA_Ext2MASS_F_Err-Gal.fits Error map in Galactic Coordinates (436 K)
- PerA_Ext2MASS_F_Den-Gal.fits Stellar density map in Galactic Coordinates (436 K)
- PerA_Ext2MASS_F_Eq-fits Map in Equatorial Coordinates (984 K)
- PerA_Ext2MASS_F_Err-Eq.fits Error map in Equatorial Coordinates (984 K)
- PerA_Ext2MASS_F_Den-Eq.fits Stellar density map in Equatorial Coordinates (984 K)
- Info File (All comments and information about this data)
The COMPLETE Survey of Outflows in Perseus
Arce, Héctor G.; Borkin, Michelle A.; Goodman, Alyssa A.; Pineda, Jaime E.; Halle, Michael W.
AA(Department of Astronomy, Yale University, P.O. Box 208101, New Haven, CT 06520, USA hector.arce@yale.edu), AB(School of Engineering and Applied Sciences, Harvard University, 29 Oxford Street, Cambridge, MA 02138, USA ), AC(Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, USA ), AD(Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, USA ), AE(Surgical Planning Laboratory, Department of Radiology, Brigham and Women's Hospital, 75 Francis Street, Boston, MA 02115, USA ; Initiative in Innovative Computing, Harvard University, 60 Oxford Street, Cambridge, MA 02138, USA)
06/2010
IOP
ISM: clouds, ISM: individual objects: Perseus, ISM: jets and outflows, ISM: kinematics and dynamics, stars: formation, turbulence
10.1088/0004-637X/715/2/1170
2010ApJ...715.1170A
Storing and managing astronomical LITTLE DATA

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### Candidate New and Extended Outflow Locations

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- 60.11 0.277
ASTRONOMY DATASURE
Dataverse

An Open-Source Application for Publishing, Citing and Discovering Research Data

Our Research Purpose
To enable data archiving and preservation through reformatting, standards and exchange protocols.

To provide control and recognition for data owners through data management and persistent citations.

Dataverse
Create your dedicated web space through a dataverse and promote your brand, publish and share research data and increase scholarly recognition.

Learn more:
- Publish Data
- Contributors, Curators and Admins Guide
- Fact Sheets

Examples of live dataverses at IQSS:
- Grinnell College Libraries
- Review of Economics and Statistics
- Murray Research Archive

Create a Dataverse

OF INTEREST...
- Version 2.1.2 Downloads Now Available on Sourceforge
- Yale Law School Roundtable Recommends the Dataverse Network
- Version 2.1.1 Downloads Now Available on Sourceforge
- Version 2.1.1 Rolled Out to IQSS Dataverse Network
The Dataverse network, available at http://thedata.org, is an open platform for publishing, sharing, discovering and citing research data. It is developed and managed by the Institute for Quantitative Social Science (IQSS) at Harvard University.

You can choose to host your data at IQSS or install your dedicated Dataverse Network. IQSS currently hosts 257 dataverses, 36,000 studies (mostly in Social Sciences), and 640,000 data files. There are 10 external installations of Dataverse.
DATVERSE

Professional archives focus on long term access by the wider community

- Persistent identifiers
- Fixity
- Backups and recovery
- Metadata standards
- Conversion standards
- Preservation standards

Data owners focus on recognition and control

- Branding and visibility
- Data discovery
- Ease of use
- Scholarly citation
- Control over updates
- Terms of access and use

... but do not attract maximum contribution from data owners

... but do not assure long-term use as would a professional archive

Courtesy: Mercé Crosas
DATaverse

Sidney Verba
Carl H. Pforzheimer University Professor
Department of Government, Harvard University (email)

BIO PUBLICATIONS DATA

All QSS Datasets >
Sidney Verba Dataverse

Search User Guides Report Issue

Sidney Verba

by Sidney Verba

New Data for "Bigmom"

by Sidney Verba

General Social Survey (GSS)

by Sidney Verba

November 2006 Post-Election Tracking

by Sidney Verba

Visit Site Research-Not Released

by Sidney Verba

Abstract: Sidney is a new data file out of my research not yet released.

Abstract: This is a new data file out of my research not yet released.

Abstract: This data set contains questions about the 2006 elections and sources of information about the election. It is used in the projects "Tracking 2006 Politics" and "Public Opinion and Voting Behavior 2006."
DATAVERSE

Data Citation

If you use these data, please add the following citation to your scholarly references. Why cite?


Citation Format [Print]

Results found in this publication can be replicated using these data.

Original Publication


Data Citation Details

Study Global ID

hdl:1902.1/15254

Authors

Alberto Pepe (University of California, Los Angeles)

Producer

Alberto Pepe, University of California, Los Angeles

Production Date

2010

Distributor Contact

Alberto Pepe (Harvard University), apepe@cfa.harvard.edu

Distribution Date

2010

Deposit Date

October 28, 2010

Provenance

Alberto Pepe Dataverse

versioning
citation
related paper
handle
distributor
What is the story of your data?

Are the data produced in the context of project X publicly available?

What publications have resulted from these data?

What form and what formats are the data in?

How large are these datasets and what is their rate of growth?

Who owns these data?
3 INTEGRATION OF DATA AND LITERATURE

Create seamless links between related astronomical resources
ASTROPHYSICS DATA SYSTEM

The SAO/NASA Astrophysics Data System (ADS) is a Digital Library portal for researchers in Astronomy and Physics. The ADS maintains three bibliographic databases containing more than 8.8 million records: Astronomy and Astrophysics, Physics, and arXiv e-prints. Integrated in its databases, the ADS provides access and pointers to a wealth of external resources, including electronic articles, data catalogs and archives. We currently have links to over 9.1 million records maintained by our collaborators.
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goodman, a
### Search Results of Query “GOODMAN, A” in ADS Labs

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- **20. 1993ApJ...406..528G** Dense cores in dark clouds. VIII - Velocity gradients
  - Goodman, A. A.; Benson, P. J.; Fuller, G. A.; Myers, P. C.

- **25. 1999AJ....117..707R** BVRI Light Curves for 22 Type IA Supernovae
  - Riess, Adam G.; Kirshner, Robert P.; Schmidt, Brian P.; Jha, Saurabh; Challis, Peter; Garnavich, Peter M.; Esin, Ann A.; Carpenter, Chris; Grashius, Randy; Schild, Rudolph E.; and 32 coauthors

- **34. 1988ApJ...326L..27M** Evidence for magnetic and virial equilibrium in molecular clouds
  - Myers, P. C.; Goodman, A. A.

- **35. 1991ApJ...376..561M** Dense cores in dark clouds. VI - Shapes
  - Myers, P. C.; Fuller, G. A.; Goodman, A. A.; Benson, P. J.

- **37. 1988ApJ...329..392M** Magnetic molecular clouds - Indirect evidence for magnetic support and ambipolar diffusion
  - Myers, P. C.; Goodman, A. A.

- **40. 1984PhRvC..30..851G** Liquid-gas phase instabilities and droplet formation in nuclear reactions
  - Goodman, Alan L.; Kapusta, Joseph I.; Mekjian, Aram Z.

- **44. 1993sprl.conf..327M** Magnetic Fields in Star-Forming Regions - Theory
  - McKee, C. F.; Zweibel, E. G.; Goodman, A. A.; Heiles, C.
  - Protostars and Planets III Editors, Eugene H. Levy, Jonathan I. Lunine; with the editorial assistance of M. Guerney and M. S. Matthews; with 91 collaborating authors; Publisher, University of Arizona Press, Tucson, Arizona, 1993. ISBN # 0-8165-1334-1. LC # QA806. P77 P. 327, 1963 n/a 1993

- **45. 1998ApJ...504..223G** Coherence in Dense Cores. II. The Transition to Coherence
  - Goodman, Alyssa A.; Barranco, Joseph A.; Wilner, David J.; Heyer, Mark H.

- **46. 1981NuPhA.352...30G** Finite-temperature HFB theory
  - Goodman, Alan L.

- **56. 1963JAP...34..329G** Metal-Semiconductor Barrier Height Measurement by the Differential Capacitance Method-One Carrier System
  - Goodman, Alvin M.
COAUTHOR NETWORK OF MOST RELEVANT PAPERS BY AUTHOR “GOODMAN, A” WITH KEYWORDS: ISM (CLOUDS, DUST EXTINCTION, GENERAL) IN ADSLABS
COAUTHOR NETWORK OF MOST RELEVANT PAPERS ABOUT “SCHOLARLY COMMUNICATION” IN ADSLABS
THANK YOU

The work presented here was done in collaboration with Alyssa Goodman (Harvard), Michael Kurtz (Harvard-Smithsonian), August Muench (Harvard-Smithsonian), Jay Luker (Harvard-Smithsonian), Christopher Erdmann (CfA Library), Alberto Accomazzi (ADS), Giovanni Di Milia (ADS), Merce Crosas (IQSS)