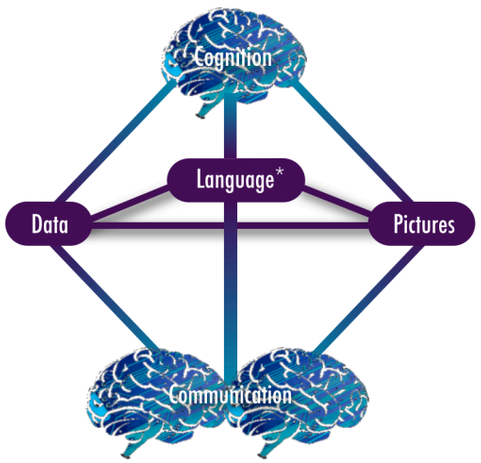
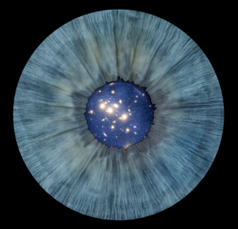
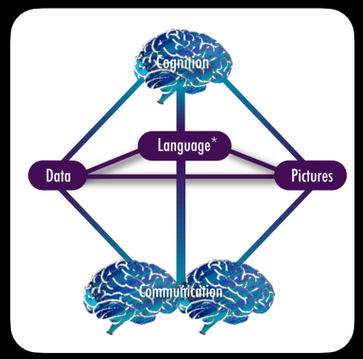
How to publish 21st Science in a 21st Century Way?

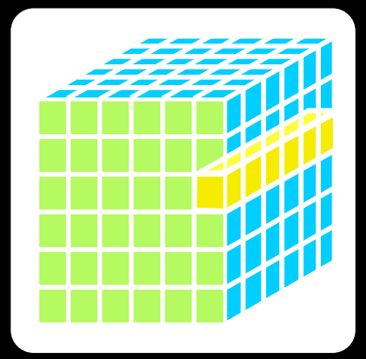


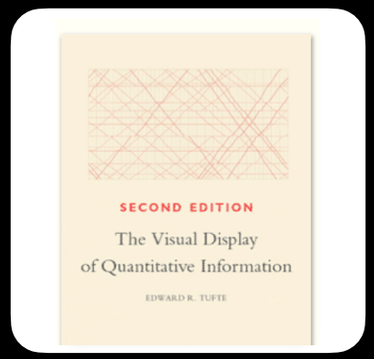
Alyssa A. Goodman
Harvard-Smithsonian Center for Astrophysics & Radcliffe Insitute for Advanced Study

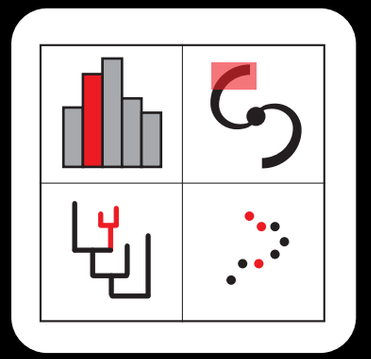
SEEING MORE OF THE UNIVERSE

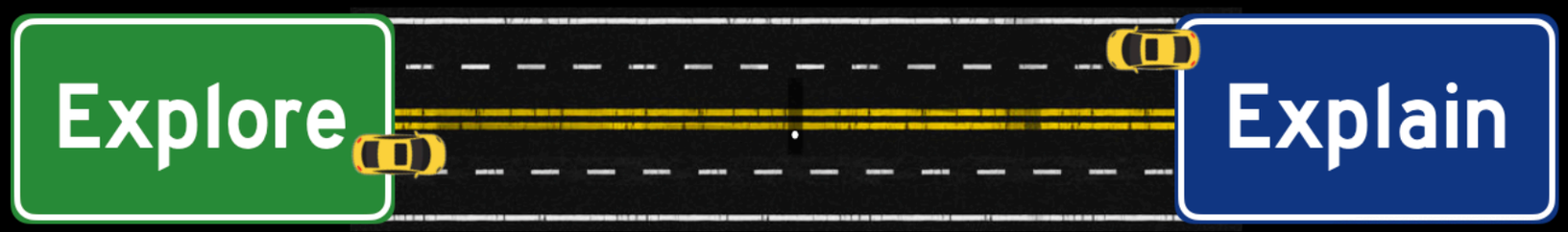




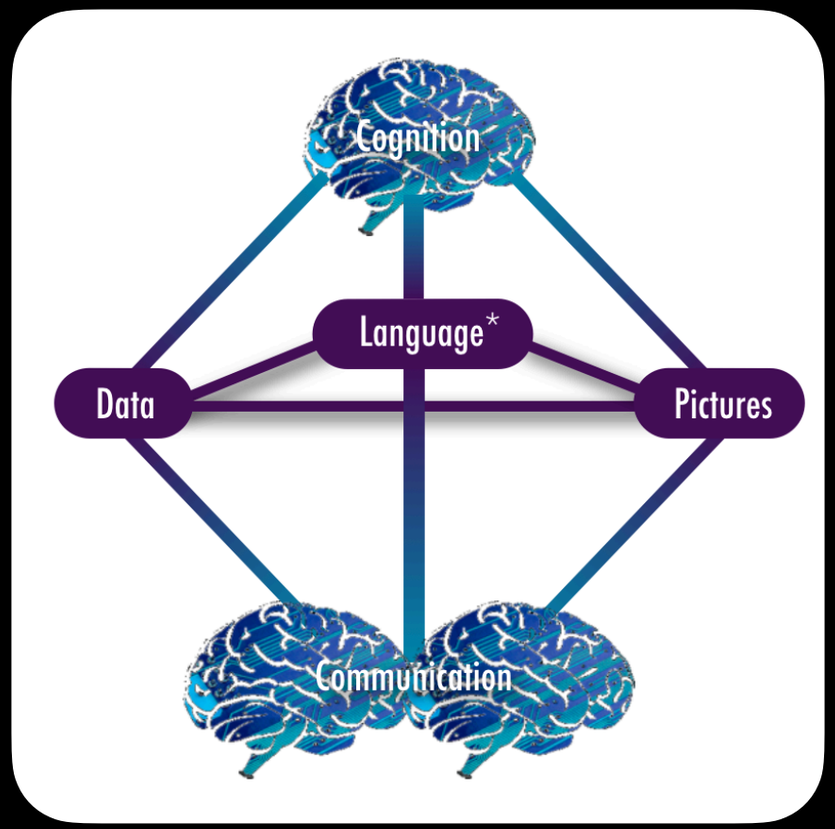








“CONNECTING DATA, LANGUAGE AND PICTURES”



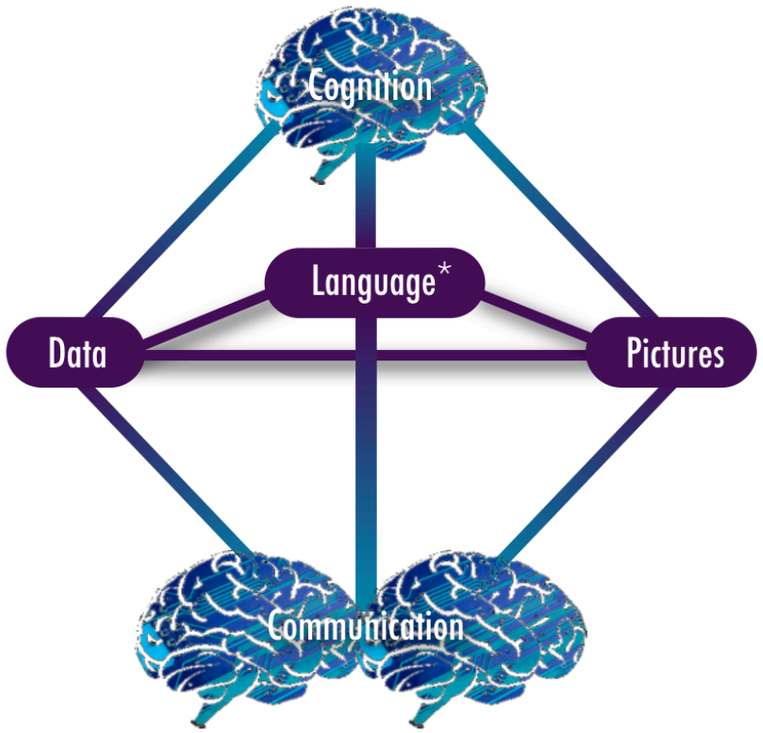
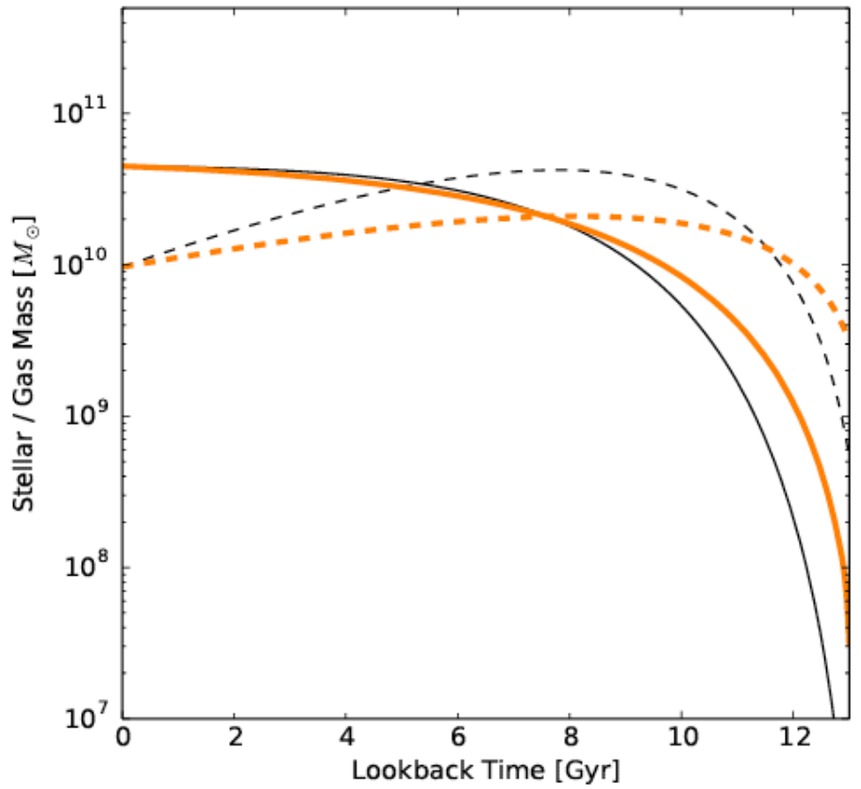
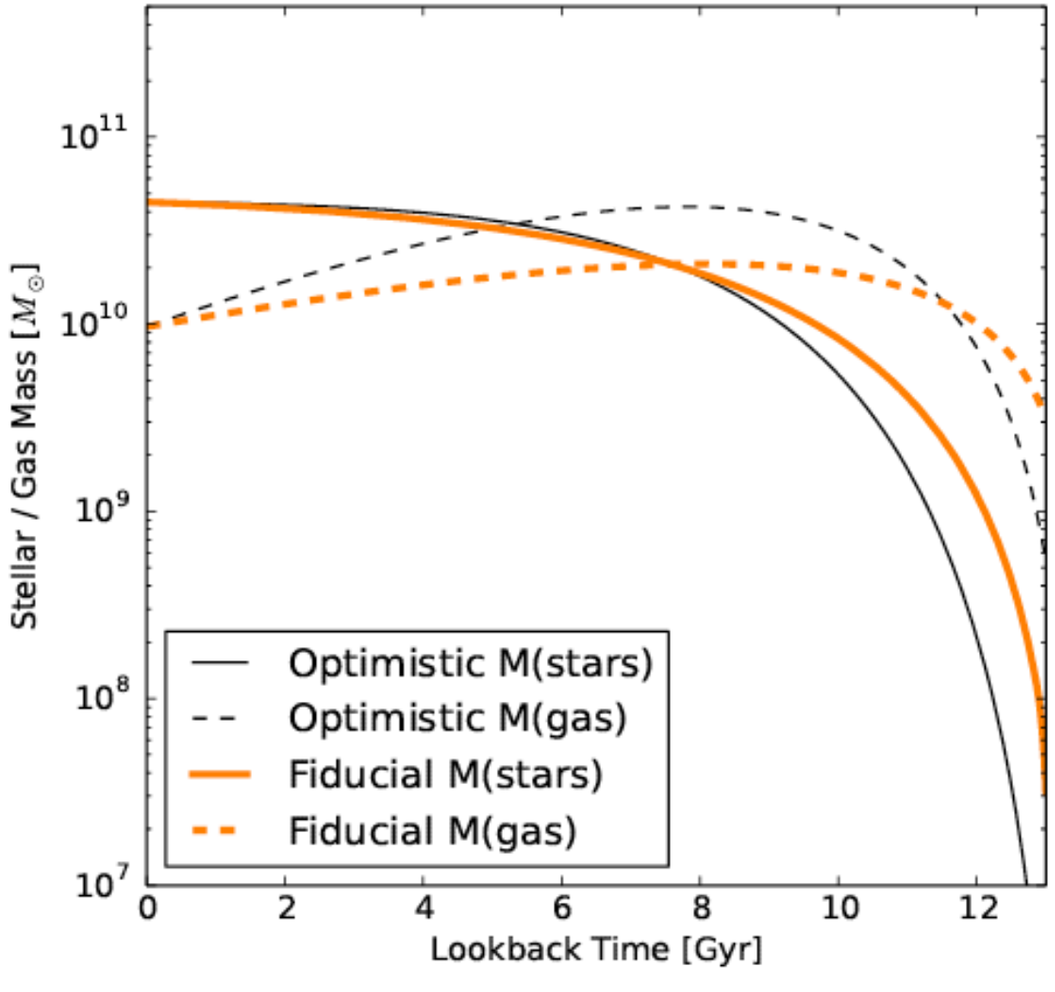
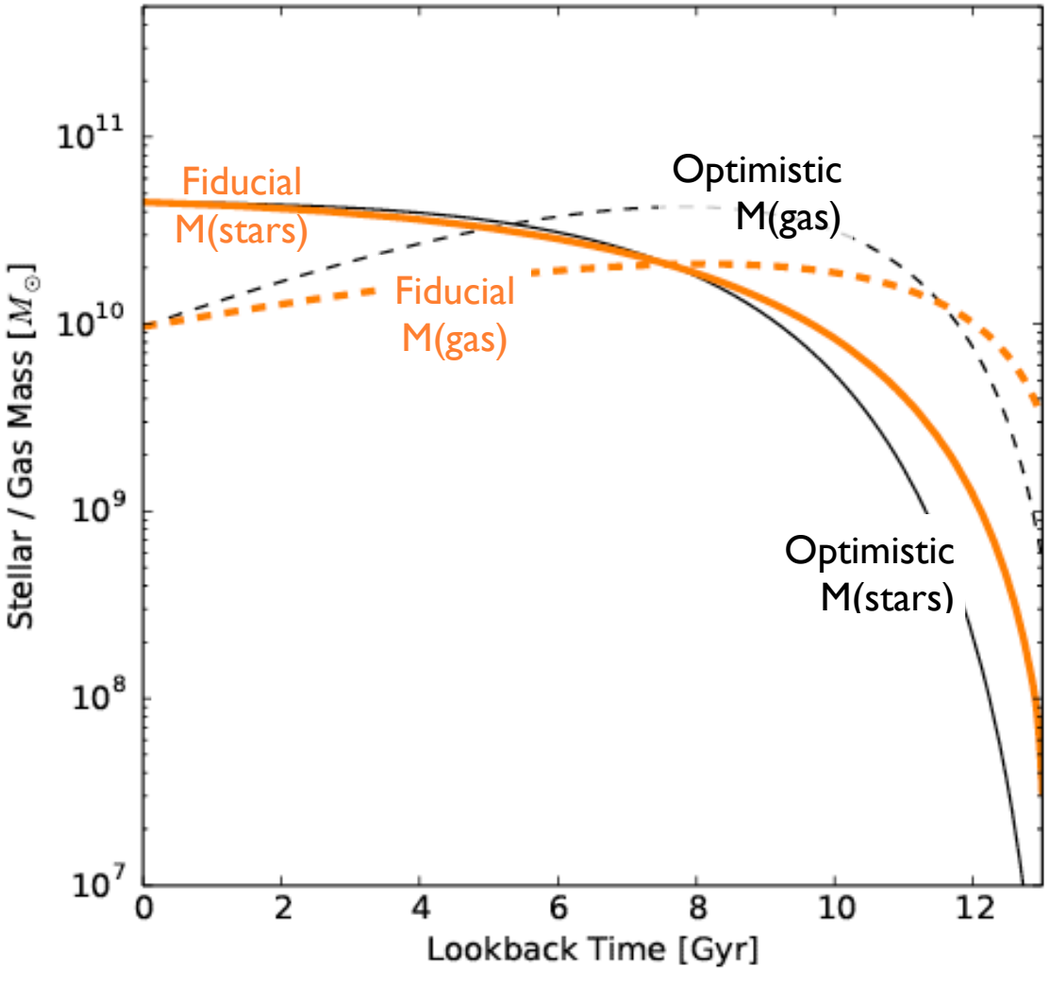


Figure Caption: The solid/ solid black line shows the optimistic case for M(stars)/ M(gas). The orange lines show the same quantities, for the fiducial case.







glue
multidimensional data exploration

enabled by d3.js [javascript] outputs

plotly

d3po

d3po is a project designed to allow an astronomer (or an
interactive, publication-quality figure that has staged buil
can be previewed at d3po.org, and represents a figure fro
figure describes how metalicity affects color in cool stars,
dragging in the scatter plots to understand the power of lin

Right now we are in search of alpha testers, who have figure
their hands a little dirty (No javascript skills needed). In futur
figures interactively. We are also exploring implementation of
version expected in January 2014.

Installing your own d3po server

```
git clone git@github.com:adrn/d3po.git
cd d3po
virtualenv --no-site-packages venv
source venv/bin/activate
pip install -r pip-requirements.txt
python run.py
```


Four Centuries of Discovery | A Chasm in Mass | Little Siblings | Close Cousins | The Strangers

After Galileo discovered the first four moons of Jupiter, it took nearly three hundred years to discover the next one.

orea

WATCH a DEMO video, and find S/W links,
on YouTube at tinyurl.com/PotF-Demo

many thanks to Alberto Pepe, Josh Peek, Chris Beaumont, Tom Robitaille, Adrian Price-Whelan, Elizabeth Newton, Michelle Borkin & Matteo Cantiello for making the PotF posible.

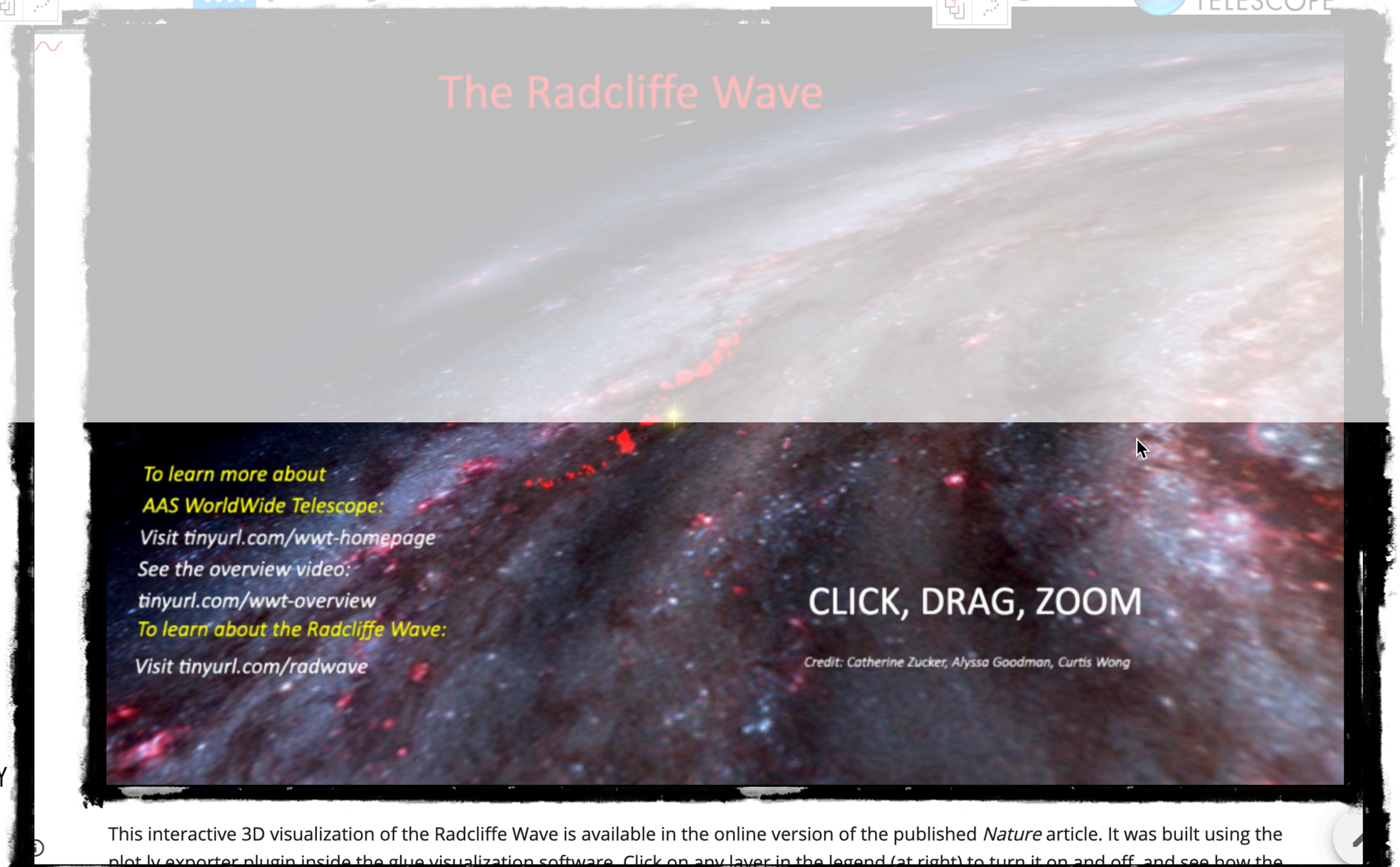
PUBLISHING'S INTERACTIVE CUTTING-EDGE & (AUGMENTED) FUTURE

glue plotly glue AAS AMERICAN ASTRONOMICAL SOCIETY WORLDWIDE TELESCOPE

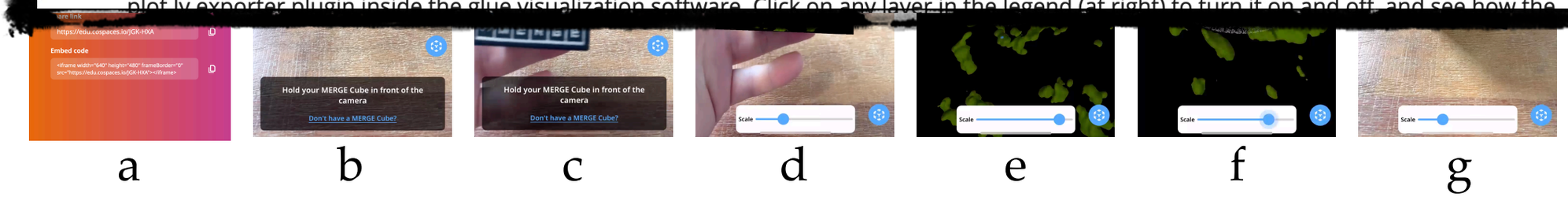
nature

PUBLISHED IN
NATURE
1-2020

ALVES ET AL.
(THE RADCLIFFE WAVE)



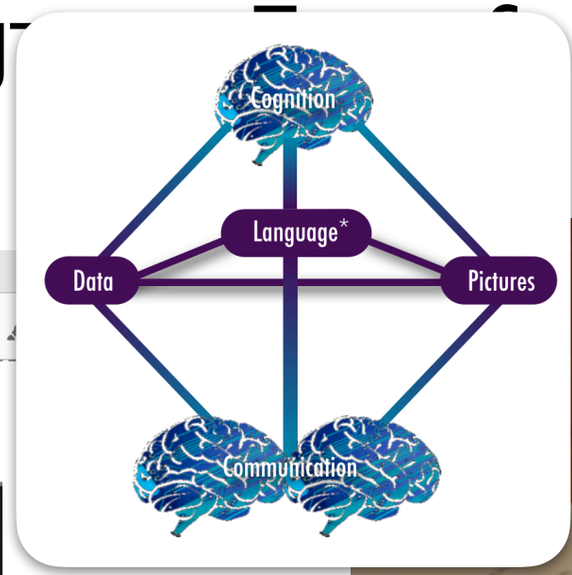
This interactive 3D visualization of the Radcliffe Wave is available in the online version of the published *Nature* article. It was built using the plot.ly exporter plugin inside the glue visualization software. Click on any layer in the legend (at right) to turn it on and off, and see how the



a b c d e f g

AUGMENTED REALITY
PROPOSED TO NSF
11-2020

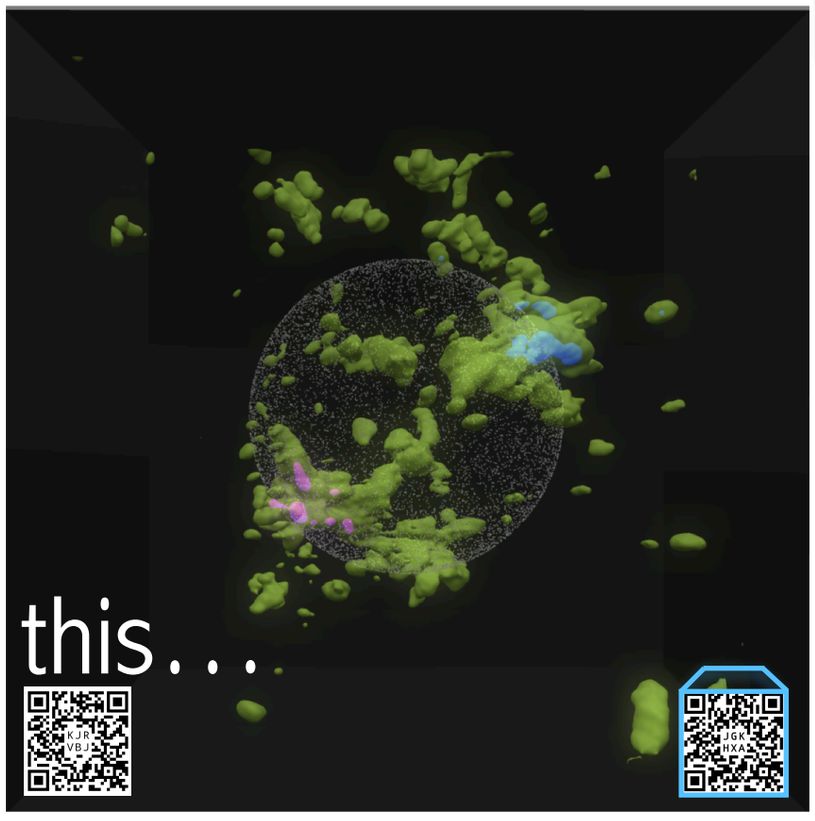
PUBLISHING'S INTERACTIVE CU… (AUGMENTED) FUTURE



main.pdf

2 (2 of 7) 90.4%

2



scan this…

FIG. 1.— Density $n = 5$ cm^{-3} iso-surfaces in the Perseus-Taurus region as derived from 3D-dust extinction observations. The coordinates are the 3D galactic $x-y-z$ coordinates (see footnote 1). Overlaid is our spherical shell model (Eq. 5). The positions of Perseus and Taurus and the sun are indicated.

It is useful to express the results in terms of gas density. We first derive a conversion factor which we use to convert the reported dust opacity density s, into gas Hydrogen nuclei particle density n (units: cm^{-3}). The gas column density and dust extinction are related through the wavelength-dependent extinction curve, $A_\lambda/N_{\rm H}$, where A_λ is the dust extinction at wavelength λ and $N_{\rm H}$ is the H nuclei column density. For the Gaia G-band, $\lambda = 673$ nm (central wavelength), $A_{\rm G}/N_{\rm H} = 4 \times 10^{22}$ mag cm^2 (reference XXX). In terms of the dust opacity $\tau_{\rm G}/N_H = 3.7 \times 10^{-22}$ cm^2. Following the definition of s_x we get

$$\Delta N_{\rm H} = s_x \left(\frac{\tau_{\rm G}}{N_{\rm H}}\right)^{-1} \frac{\Delta L}{\rm pc} \,. \quad (2)$$

Dividing by ΔL we obtain the gas density (averaged over the 1 pc^3 resolution element):

$$n = \frac{\Delta N_{\rm H}}{\Delta L} = 880\, s_x \ {\rm cm}^{-3} \,. \quad (3)$$

tion of the 3D position, (x, y, z).

The gas density obtained via Eq. (3) is approximate as it includes several approximations. First, it assumes an extinction curve $A_\lambda/N_{\rm H}$ that is independent of position. In practice, there may be variations in the dust properties which result in deviation from the canonical extinction curve. Second, it includes uncertainties involved in the derivation of the original 3D dust map of **?**, e.g., their assumptions on the priors, etc. (see **?** for more details XXX). The derived densities are accurate probably to within a factor of 2-3. With these uncertainties in mind, we note that this is a unique opportunity to explore observationally the 3D density structure of the ISM in the solar neighborhood.

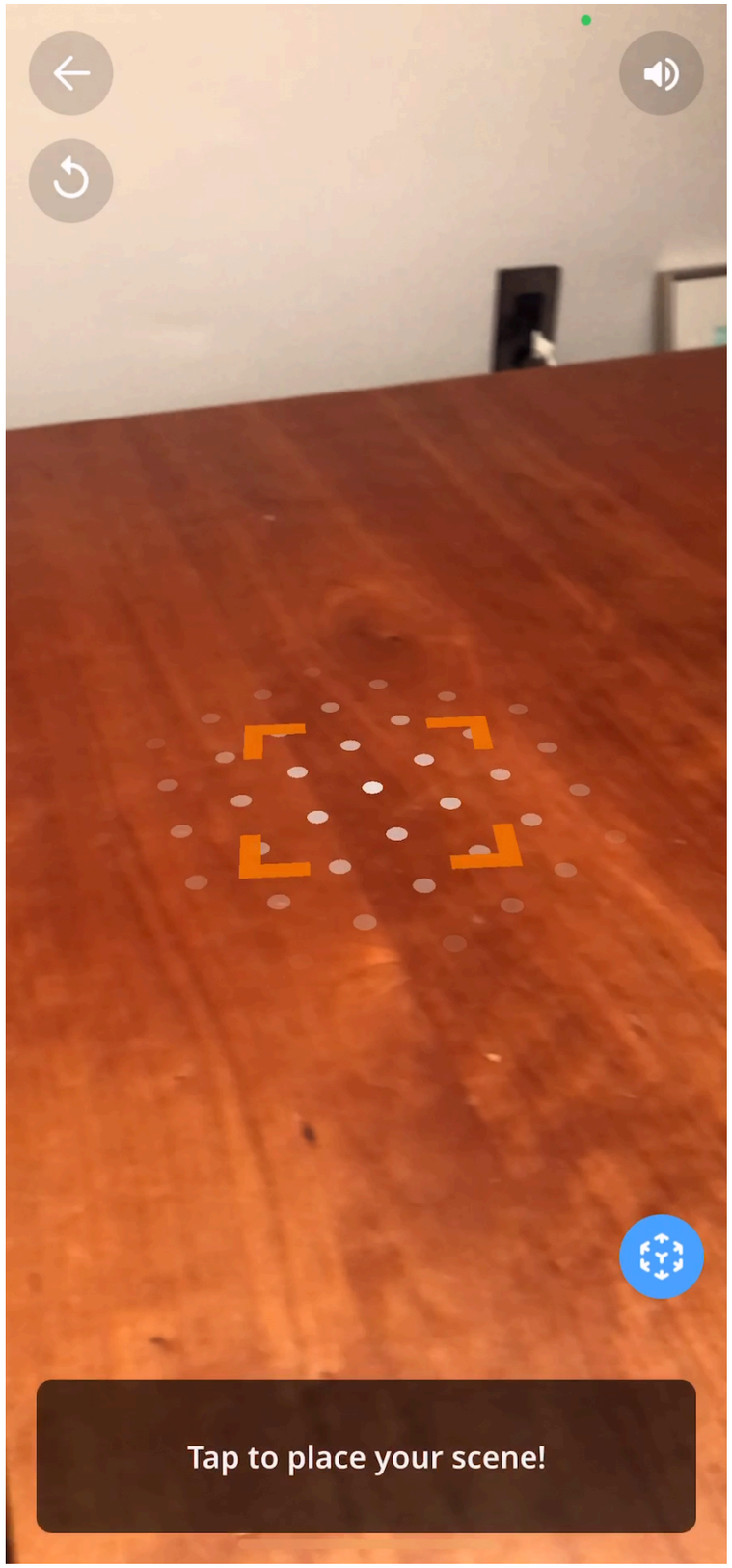
3.2. *Characterizing the shell profile*

Radially-averaged mean density: In §4 we explore the 3D density structure in the Perseus-Taurus region, and discuss a large 3D-shell structure, extending from the Taurus

BIALY ET AL. 2021

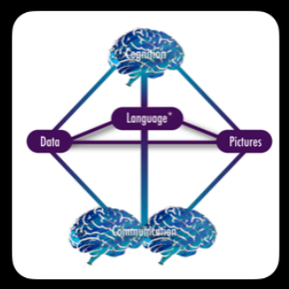
…see this

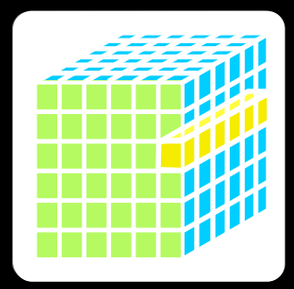
PUBLISHING'S INTERACTIVE CUTTING-EDGE & (AUGMENTED) FUTURE

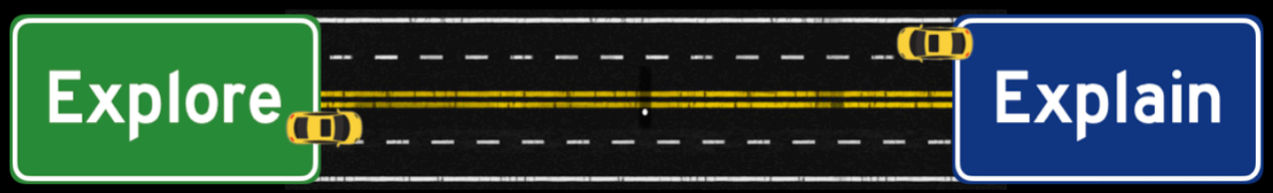


DEMO DATA WILL APPEAR IN BIALY ET AL. 2021, AR TECHNOLOGY WILL PREMIERE IN ZUCKER ET AL. 2021

Seeing more of the Universe

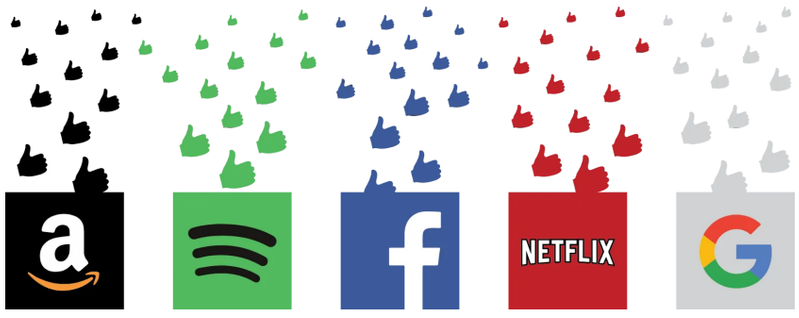




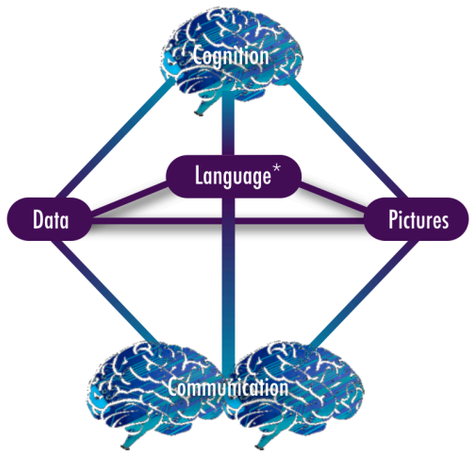


Find the Full Series on YouTube

tinyurl.com/10QVizVideos



Recommender systems—what to do about sparsely-populated sub-fields?



ADS ALL SKY SURVEY use literature as data?

jupyter "Jupyter notebooks as papers" — is that Authorea at some level? Au

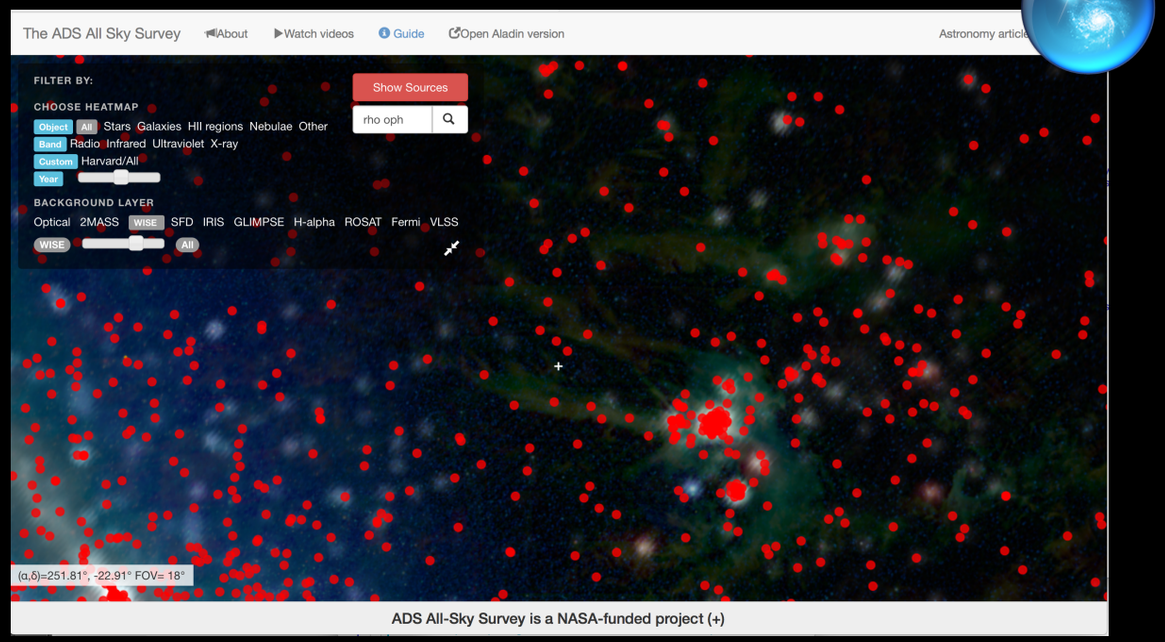
more podcasts?

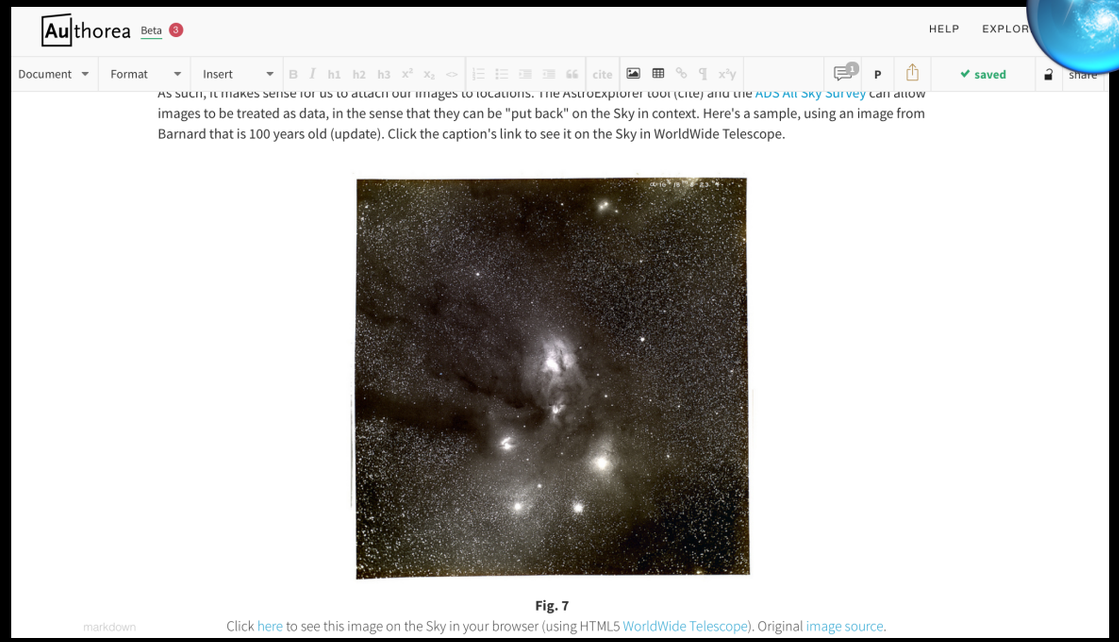
Video Abstracts?
Have not been popular (yet?)—
how about linking to talks instead?

The Dataverse Network™ Project

Data in papers is great
—but I really want "talks in papers" too...

Literature as (a filter for) Data

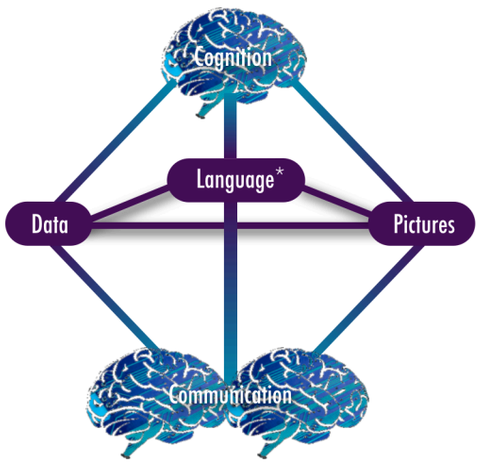




Many thanks to Alberto Pepe, August Muench, Thomas Boch, Jonathan Fay, Michael Kurtz, Alberto Accomazzi, Julie Steffen, Laura Trouille, David Hogg, Dustin Lang, Christopher Stumm, Chris Beaumont & Phil Rosenfield for making this all work!

+ask me about 2021 update re:NASA ADAP Jill Naiman/Peter Williams/A. Goodman ML follow-on

How to publish 21st Science in a 21st Century Way?



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