

Cosmic Origins Science Enabled by the WFIRST Data Archive

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Cosmic Origins / Science Analysis Group #8

COR Science Analysis Groups

- SAGs consist of interested, unpaid volunteers
- SAGs report to NASA's Astrophysics Subcommittee
- SAGs carry out analyses but give no advice
- SAGs say what's needed to get done, not who does what
- SAG8 commissioned by NASA's Astrophysics Subcommittee with charter
- SAG8 charter covers all of Cosmic Origins science (aka general astrophysics) enabled by the WFIRST archives

Summary of SAG#8 Charter

SAG #8 will:

- Solicit from the community the types of investigations that will be conducted with WFIRST archival data
- Analyze how the archive is to be used and scope the data requirements* necessary to conduct COR science investigations
- Identify the kinds of data products that are valued and needed
- Consider what other assets or efforts may be needed to maximize the science return from the WFIRST archive (e.g., coordination of WFIRST-AFTA data with LSST, Euclid, or JWST)

* high-level science products, catalogs, archive interface design, calibration requirements, data accessibility and distribution, computing resources, and archive operations

Scientists have told us how they want to use the WFIRST archives



SDT Interim Report 2013, SDT Final Report, May 2015

Summary of SAG8 Findings:

What would make the WFIRST archive useful

1. Ability to select objects of interest using catalogs, relational data bases, 20-question query tools

Some examples:

- Find all black holes by the apparent shift during a microlensing event (Sahu, D-18)
- Find all L or T brown dwarfs in the high latitude survey by their magnitudes and WFIRST +WISE colors (Tanner, D-12)
- Find all galaxies showing double nuclei (Conselice, D-32)
- Find all galaxies whose LSST + WFIRST SED's indicate a $z_{\text{phot}} > 7$
- Find all elliptical $z > 1$ galaxies whose spectra show an anomalous emission line (Szalay, Q11)
- Find all galaxies in clusters at $z \sim 0.5-1.5$ in which >0.5 -mag flux variations were detected (Kruk)

Summary of SAG8 Findings:

What would make the WFIRST archive useful

1. Ability to select of data by type of object (e.g. LRG) → catalogs, relational data bases, 20-question query tools
2. WFIRST data processed (instrument signature removed) *and* measurements made on the data
 - Morphology: Sersic index; Gini/M20, etc.
 - Astrometry: positions, parallaxes, proper motions of stars & stellar BHs, stellar streams, galaxies... i.e. EVERYTHING!
 - Photometry – magnitudes & luptitudes, colors, photo-z's, etc.
 - Spectral measurements: line IDs & spectro-z's, etc.
 - Time domain information
3. Access to data from other telescopes
e.g. E-ROSITA (X-ray), Subaru HSC & Subaru PFS

SAG8 report posted on web at:

[http://cor.gsfc.nasa.gov/sags/
SAG8_Final_Report.pdf](http://cor.gsfc.nasa.gov/sags/SAG8_Final_Report.pdf)

S 1: Introduction

S 2: GenAp with the WIRST archives

S 3: WFIRST observations, data
processing, data products

S 4: Accessing the WFIRST archives

**Cosmic Origins Science Enabled by
the WFIRST-AFTA Archives**

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Status of SAG#8

SAG #8 will:

- ✓ Solicit from the community the types of investigations that will be conducted with WFIRST archival data
- Analyze how the archive is to be used and scope the *data requirements** necessary to conduct COR science investigations
- ✓ Identify the kinds of data products that are valued and needed
- Consider what other assets or efforts may be needed to maximize the science return from the WFIRST archive (e.g., coordination of WFIRST-AFTA data with LSST, Euclid, or JWST)

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Next Steps

- Issue call to the community for science *data* requirements
- Collate and analyze input from the SITs about their requirements and contributions
- Collate & analyze input from other observatories on the ground and in space
- Report the results of our analysis to the NASA Director of Astrophysics (Paul Hertz) and Astrophysics Subcommittee

Make Your Voice Heard

Join the COPAG and participate in SAG#8

Contact Sally to join (Sara.Heap@gmail.com)

Join us at SAG#8 meetings (AAS meetings)

AAS 228th Mtg — June 2016, Hilton San Diego Bayfront, San Diego, CA

AAS 229th Mtg — January 2017, Gaylord Texan Hotel, Grapevine, TX

AAS 230th Mtg — June 2017, JW Marriott Austin, Austin, TX

We need you!

Sources of Information

