# Frontier Fields Data

**This page is a clearing-house site for links to other public data on the Frontier Fields. If you have data you wish to share, please email frontierfields@stsci.edu. Please credit these data products appropriately -- see the links below.**

| Data Product | Abell 2744 | MACS0416 | MACS0717 | MACS1149 | Abell S1063 | Abell 370 |
|---|---|---|---|---|---|---|
| **Hubble Frontier Fields**<br>J. Lotz, PI; M. Mountain, Co-PI<br>ACS B, V, I; WFC3/IR Y, J, J+H, H | Images<br>Models | Images<br>Models | Images<br>Models | Images<br>Models | Images<br>Models | Images<br>Models |
| **Spitzer Frontier Fields**<br>PI T. Soifer, P. Capak<br>IRAC 3.6, 4.5 microns | Imagesblocked URL | Imagesblocked URL | Imagesblocked URL | Imagesblocked URL | Imagesblocked URL | Imagesblocked URL |
| **Chandra Frontier Fields**<br>archival, C. Jones-Formanblocked URL<br>S. Murray<br>(enter RA/Dec for Chandra archive search) | Imagesblocked URL | Imagesblocked URL | Imagesblocked URL | Imagesblocked URL | Imagesblocked URL | Imagesblocked URL |
| **Subaru / Suprimecam**<br>CLASH team<br>B, V, Rc, I, z | -- | Images<br>Catalogs | Images<br>Catalogs | Images<br>Catalogs | -- | -- |
| **VLT / Hawk-I**<br>PI Marchesini, Brammer<br>K | Viewer<br>Imagesblocked URL | Imagesblocked URL | -- | -- | -- | -- |
| **Gemini / GeMS**<br>PI Carrasco, Levenson<br>K | | Reduced and<br>Raw Datablocked URL | -- | -- | -- | -- |
| **ESO / MPG-2.2m WFI**<br>PI Gruen<br>optical | -- | Images and<br>Catalogblocked URL | -- | -- | -- | -- |
| **Spec. Redshifts**<br>(lensed galaxies for<br>public lensing maps only) | Catalog | Catalog | Catalog | Catalog | Catalog | Catalog |
| **Spec. Redshifts**<br>(published) | Owers M., et al.blocked URL | Ebeling H., et al.<br>Balestra, et al.blocked URL | Ebeling H., et al. | Ebeling H., et al. | -- | -- |
| **Photometric Redshifts**<br>CLASH team | -- | Catalog | Catalog | Catalog | Catalog | -- |

## Hubble Frontier Fields

All data for this observing program is nonproprietary and available immediately upon entry into the Mikulski Archive for Space Telescopes (typically within 24 hours of observation).

STScI is releasing fully-calibrated high-level science products ready for scientific analysis by the astronomical community soon after the raw data are obtained. These will be updated on a regular basis as the data arrive. To retrieve these data products, see theMAST HST Frontier Fields data products web page.

## Spitzer Frontier Fields

The Spitzer Space Telescope will devote up to ~1000 hours of DD time to imaging the Frontier Fields with IRAC at 3.6 and 4.5 microns. These data are expected to reach ~26.5 ABmag at 5 sigma for a point source. At the moment, SST has committed to observing the first four Frontier Fields -- Abell2744, MACSJ0416.1-2403, MACSJ0717.5+3745, and MACSJ1149.5+2223 during SST Cycle 10.

For details of the SST observing plan, see:Spitzer FF Observing Planblocked URL

To download SST Frontier FIelds data, go to:IRSA/SST archival datablocked URL

**Spitzer Implementation Team:**
Peter Capak
Jason Surace
Lisa Stori-Lombardi

## Chandra Frontier Fields

Archival Chandra ACIS data is available for all of Frontier Fields. The Chandra ACIS field of view encompasses both cluster + parallel fields in a single pointing.

Additional ACIS imaging is planned in Chandra Cycle 15 for Frontier Fields MACS0416, MACS0717, and MACS1149 through a GO Large Chandra Program #15800858blocked URL (PI C. Jones-Forman) and a Chandra GTO program (PI S. Murray).

## Subaru / Suprimecam

Subaru / Suprimecam imaging obtained by multiple observers. Reduced images and catalogs produced by the CLASH team. Please use the acknowledgement information found in the readme files associated with each data set.

## VLT / Hawk-I

VLT / Hawk-I K-band imaging obtained and reduced by G. Brammer, E. Barker, I. Labbe, and L. Spitler.

## Gemini / GeMS

We observed one of the Hubble Space Telescope Frontier fields cluster: MACSJ 0416.1-2403 in January 2014. Deep images were obtained between January 13 and January 22, 2014, totaling 5.3 hours of on-source integration using the K-short filter (individual exposure times of 120sec). During the observations, the AO-corrected FWHM varied between 0.075 arcsec to 0.100 arcsec. The observations are centered at RA=04:16:07.981, DEC=-24:04:50.18 and have an overlap with the HST/ACS observations obtained recently (or planned to be obtained). Note that the coordinates of the field don't match exactly the center of the HST FF due to the guide star used to fast tip/tilt correction.

The data are public and can be accessed through the Gemini Science Archive (Program ID: GS-2013B-DD-1). The direct link to the raw data is the following: http://www.cadc-ccda.hia-iha.nrc-cnrc.gc.ca/cadcbin/gsa/wdbi.cgi/gsa/dssc_GSAOI/query?tobject===MACSJ%200416.1-2403&simbad=none&ut_date_time=2014-01-13..2014-01-22&wdbi_order=ut_date_time.value

Calibrations (Domeflat, photometric standard) can be downloaded following the instructions at http://www.gemini.edu/sciops/instruments/gsaoi/calibrations?q=node/11901 for Calibration data retrieval from GSA. The easiest way to reduce the data (flats, sky subtraction, etc) is to use the GSAOI package inside the Gemini package. Mosaic-ing and stacking the data is more complicated and requires additional work.

## Spectroscopic Redshifts

Spectroscopic redshifts of multiply-imaged lensed galaxies obtained by multiple observers and shared for use by the Frontier Fields lens modelers.

Abell 2744, Owers link: Owers, M. et al., 2011, ApJ, 728, 27

MACS0416/MACS0717/MACS1149, Ebeling links: Ebeling, Ma, & Barrett, 2014, ApJS, 211, 21

MACS0416, Balestra et al., 2015blocked URL, CLASH-VLT

## Photometric Redshifts

HST Photometric Redshifts are based on CLASH imaging and estimated by the CLASH team.

## ASTRODEEP Catalogs

The ASTRODEEP team has produced multi-band photometry catalogs for Abell 2744 and MACSJ0416 for both the cluster and parallel fields. These catalogs include the full HST, Spitzer, and HAWK-I Ks imaging datasets and are available hereblocked URL.

Associated publications:

Merlin et al. 2016 arXiv:1603.02460blocked URL

Castellano et al. 2016 arXiv:1603.02461blocked URL