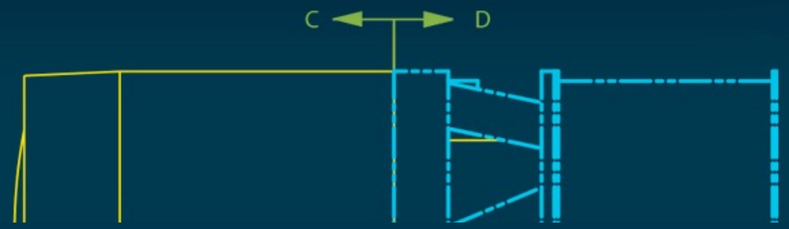
LSST SCIENCE COLLABORATIONS

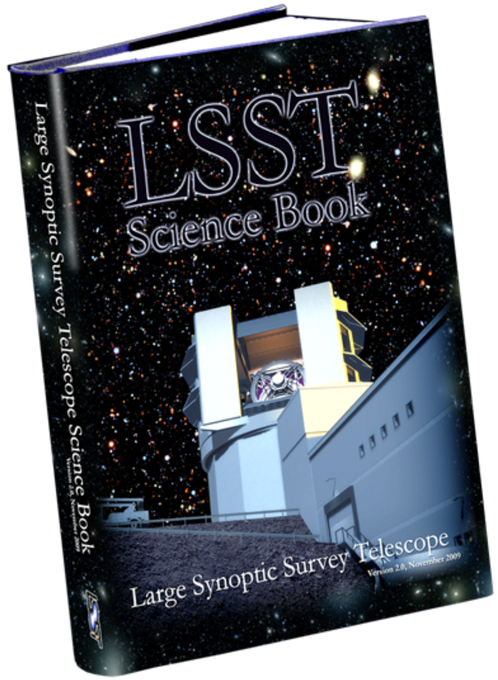
LUCIANNE WALKOWICZ
LSST Science Collaboration Coordinator



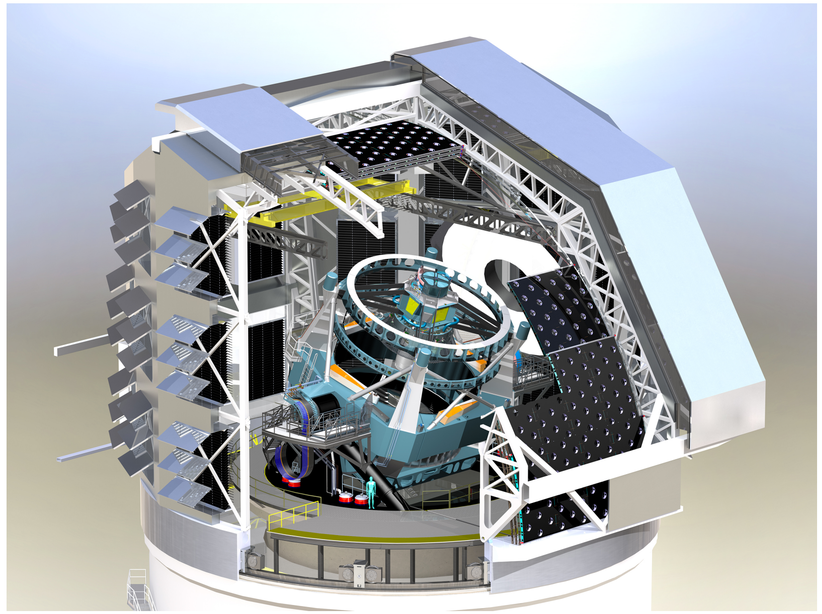
What are the LSST Science Collaborations?

Topical working groups that provide scientifically-motivated feedback to survey design/implementation decisions

Why do the LSST Science Collaborations exist?



Collaborations played big role in making the science case for LSST



Now they help lay ground work for making the best use of LSST

Who may belong to a science collaboration?

Anyone with rights to LSST data may apply to be a member of the science collaboration of their choice

Science collaborations manage their own membership (and associated rules)

Who may belong to a science collaboration?

Australia
The University of Sydney - ARC CAASTRO
The University of Western Australia (UWA)

Brazil
Laboratorio Interinstitucional de e-Astronomia (LIneA)
Laboratorio Nacional de Astrofisica (LNA)
Rede Nacional de Ensino e Pesquisa (RNP)
Academic Network at Sao Paulo (ANSP)
Americas Pathways (AMPATH)

Canada
University of Toronto (UofT)

Canary Islands
Instituto de Astrofisica de Canarias (IAC)

China
LSST-China Consortium

Chile

Croatia
Ruđer Bošković Institute (RBI)

France
IN2P3

The United States

Germany
Ludwig-Maximilians-Universität (LMU)
Max Planck Institute for Astrophysics (MPA)
Max Planck Institute for Astronomy (MPIA)

Hungary
Eotvos Lorand University (ELTE)
Konkoly Observatory

India
Inter-University Centre for Astronomy and Astrophysics (IUCAA)

Korea
Korea Astronomy and Space Science Institute (KASI)

New Zealand
University of Auckland (UOA)

Serbia
Nano Center

South Africa
The National Research Foundation (NRF)

Switzerland
Eidgenoessische Technische Hochschule Zuerich (Eth Zuerich)

Taiwan
Academia Sinica Institute of Astronomy & Astrophysics (ASIAA)

United Kingdom
Science and Technology Facilities Council (STFC) - UK LSST Consortium

There are currently nine science collaborations

Galaxies

Michael Cooper (UC Irvine) & Brant Robertson (UCSC)

Stars, Milky Way & Local Volume

John Bochanski (Rider); John Gizis (U Delaware); Nitya Kallivayalil (U VA)

Solar System

Lynne Jones (UW); David Trilling (NAU)

Dark Energy

Rachel Bean (Cornell) & Jeff Newman (Pitt)

AGN

Niel Brandt (Penn State)

Transients & Variable Stars

Federica Bianco (NYU); Ashish Mahabal (Caltech)

Large-scale Structure

Eric Gawiser (Rutgers); Anže Slosar (BNL)

Strong Lensing

Phil Marshall (KIPAC)

Informatics & Statistics

Tom Loredo (Cornell); Chad Shafer (CMU)

LSSTC & Enabling Science

Science Collaborations are eligible to apply for seed funds from the LSST Corporation

LSSTC and the Enabling Science Committee have been instrumental in facilitating science collaboration activities

Activities Across Science Collaborations

- Developing quantitative metrics for evaluating the LSST Observing Strategy, using LSST simulated operations
- Outlining and implementing road maps for the path to LSST science
- Meeting to foster working collaborations that bring LSST to fruition
- Onboarding new membership!

ls.st/o5k

Science-Driven Optimization of the LSST Observing Strategy

A community white paper about LSST survey strategy ("cadence"), with quantifications via the Metric Analysis Framework. We are drafting some individual science cases, that are either very important, and somehow stress the observing strategy, and descriing how we expect them to be sensitive to LSST observing strategy. MAF metric calculations are then being designed and implemented - we started this during the 2015 LSST Observing Strategy Workshop (in Bremerton, WA, August 17-21): these will form the quantitative backbone of the document. You may have heard of the coming "Cadence Wars" - this document represents the Cadence Diplomacy that will allow us, as a community, to avoid, or at least manage, that conflict. We welcome contributions from all around the LSST Science community.

- **Read the current draft of the white paper** (automatically generated PDF, updated every hour, in principle - log file is here) build passing
- **Join the conversation about this project at its issues list**
- **Gauge the project's activity level**
- **Suggest a new `OpSim` experiment**
- **Suggest some interesting commissioning observations**

Shortcuts

Recent Science Collaboration Updates

- Photo-z workshop @ Pitt
  - defining requirements, improving simulations and designing data challenges, improving photo-z methods
- Transient/Variable Stars roadmapping workshop
  - progress defining next steps within subgroups; members applying for focused workshops
- DESC Schools/Hack Days
  - in second year & going strong! ~50 attendees per school, 2/3 grad students & postdocs for past 2 schools
- Cross-correlation workshop, 5/22-25 @ BNL
- Statistical Challenges in Modern Astronomy VI, 6/6-10 @ CMU
- Working meeting of Milky Way/Local Volume collaboration, 6/12-16 @ AAS
- LSST Galaxies Workshop 7/22-23, Oxford
  - work between US & UK Galaxies members to finalize input to the extragalactic roadmap

Recent Work on Roadmaps

LSST Extragalactic Roadmap Meeting

Cross-collaboration vision for extragalactic science with LSST

LSST Solar System Science Collaboration Observing Strategy Work

Building on previous roadmap and extending to observing strategy

LSST Transients/Variable Stars Science Collaboration Roadmap work

Path to characterization and classification of the alert stream

LSST Solar System Science Collaboration (SSSC) Roadmap Workshop

In a single visit, LSST can detect up to 5000 moving objects. Over its 10 year lifespan, LSST could catalog over 5 million Main Belt asteroids, almost 300,000 Jupiter Trojans, over 100,000 NEOs, and over 40,000 TNOs. Many of these objects will receive 100's of observations, in multiple bandpasses. This amounts to increases of 10-100 times in the known populations, with similar increases in the number of objects with enough data to generate lightcurves and colors. LSST will begin survey operations in 2021; now is the time to prepare!

Register for this meeting.

Oxford DESC & Galaxies Meetings

DESC Collaboration meeting July 18-22
Galaxies Collaboration meeting July 22-23

Galaxies meeting co-organized by Sugata Kaviraj (Hertfordshire), Roger Davies(Oxford), Brant Robertson(UCSC)

Cross-collaboration work on LSST Extragalactic Roadmap

Transients and Variable Stars Informatics & Statistics

2016-2017 SAMSI Program on Astrostatistics

"Statistical, Mathematical and Computational Methods for Astronomy"

Opening workshop held at SAMSI August 22 through 26

Possibility exists for funded, extended visits to SAMSI to enable collaboration. Postdoctoral positions are also available.

Contact for more information: G. Jogesh Babu, babu at psu dot edu

Stars, Milky Way & Local Volume

Actively working on:

Star-Galaxy Separation (with Colin Slater at LSST)
Crowded Field Photometry (see breakout)
Astrometry - Simulation lead by Monet

See also contributions to Observing Strategy whitepaper, led by Clarkson and Vivas (includes work on special surveys like the LMC/SMC, galactic plane)

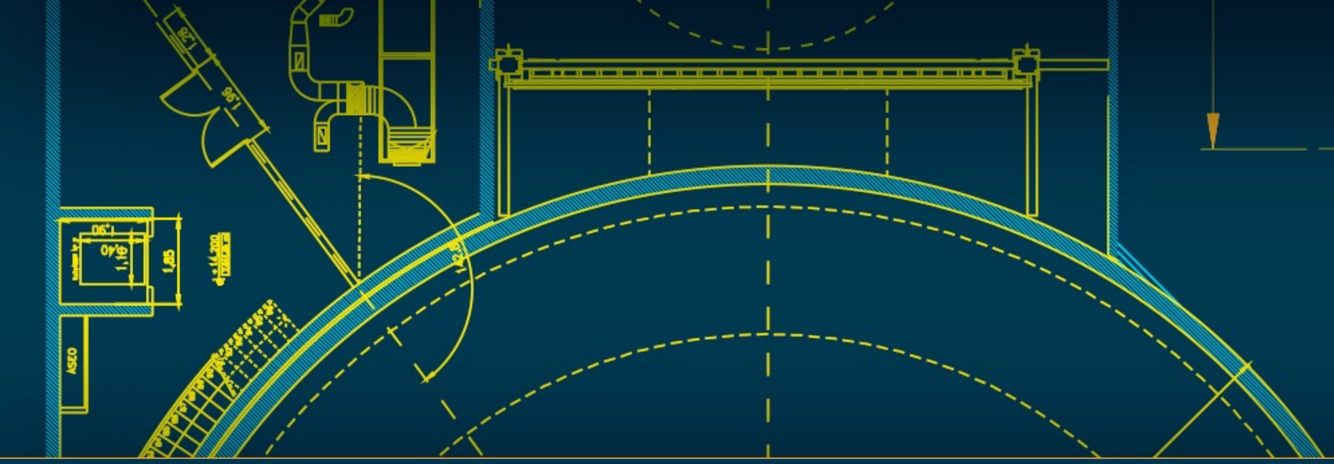
Near-Future Science Collaboration Activities

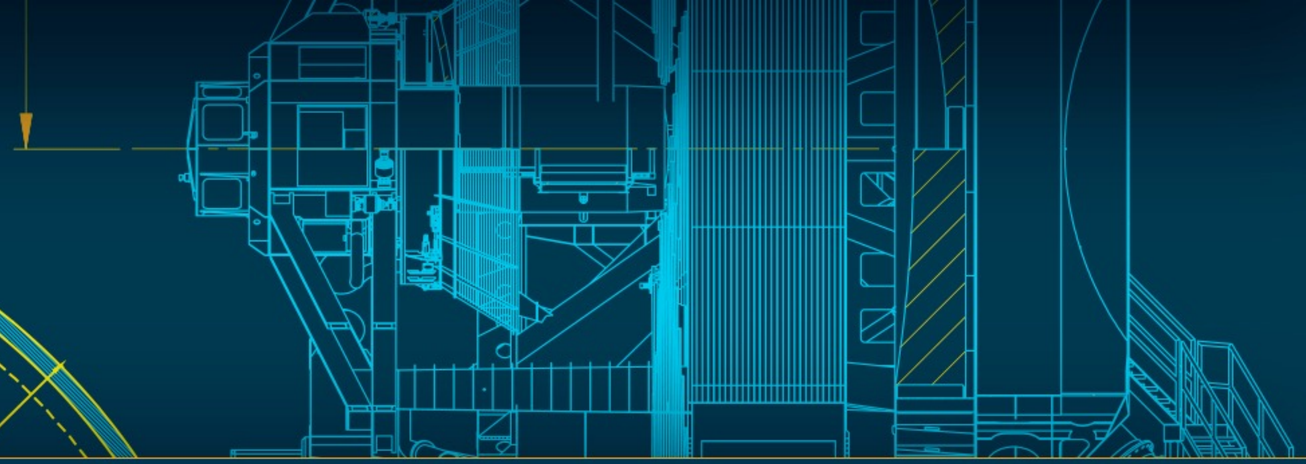
- Solar System Collaboration Meeting @ DPS, October 2016

- SMWLV Collaboration Meetings now by videocon every ~3 months

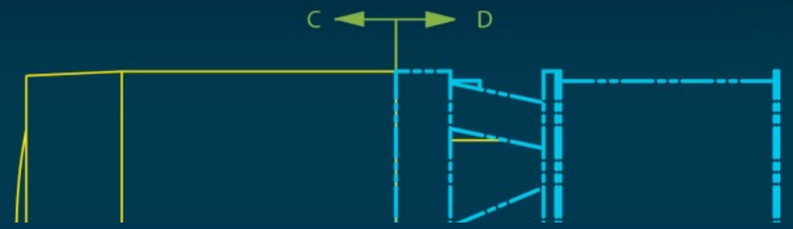
- AGN Science with LSST Splinter Meeting

  Part of the AAS Meeting in Grapevine, Texas, USA on 2017 January 3-7
  Main organizers: Ohad Shemmer (UNT), Niel Brandt (Penn State), and Gordon Richards (Drexel)





WHERE CAN I LEARN MORE?



Science Collaboration Webpages

https://www.lsstcorporation.org/science-collaborations

Dark Energy

Active Galactic Nuclei

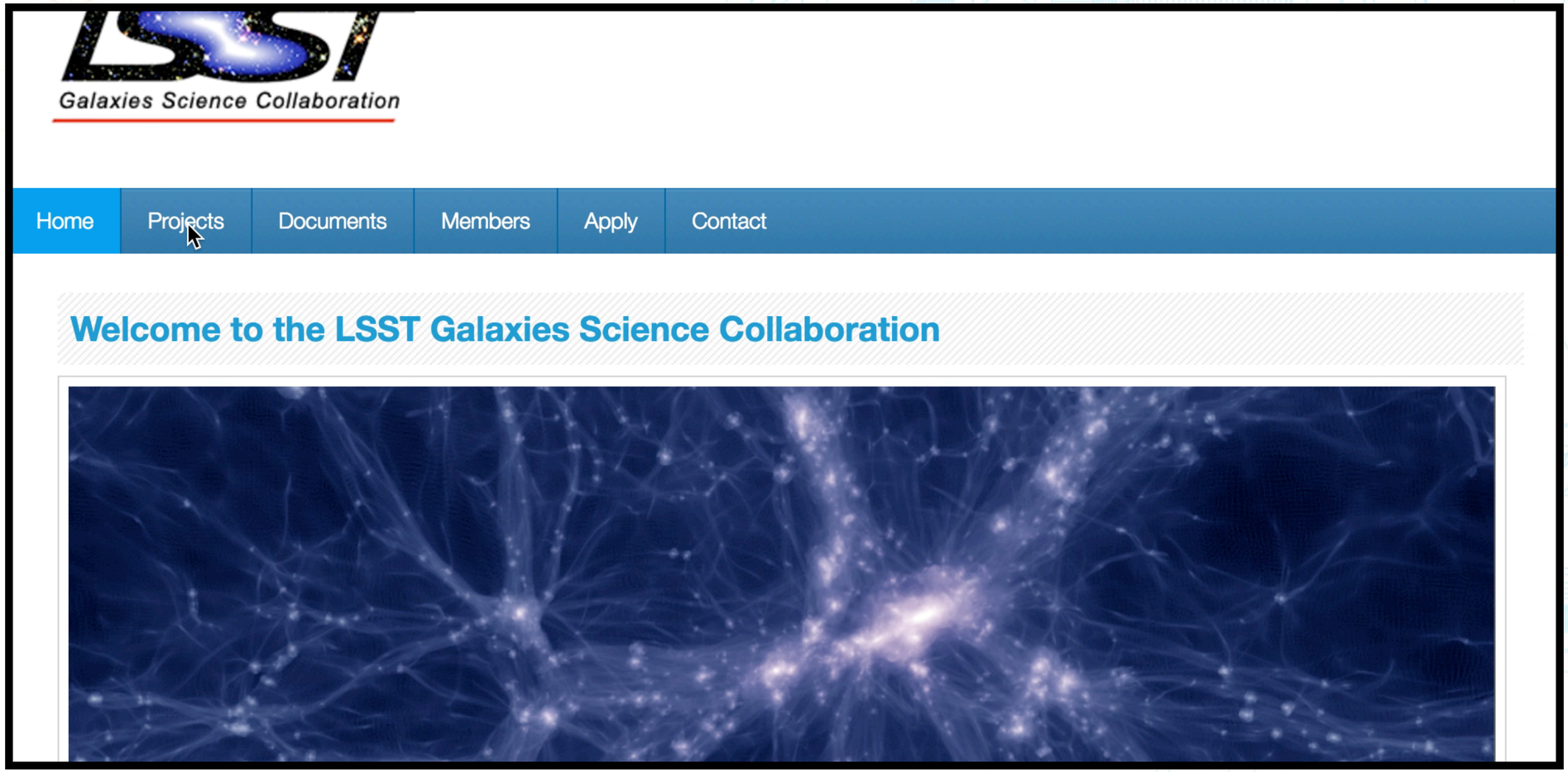
Transients/variable stars

Large-scale structure/baryon oscillations

Strong Lensing

Informatics and Statistics

Webpages provide collaboration overviews



DESC

Featured Projects

We are very happy to announce the second release of DESC Featured Projects.

As described in the DESC white paper, the collaboration has identified a number of high-priority tasks that need to be completed in the near-term in order to help prepare for LSST analysis, make synergistic connections with ongoing cosmological surveys and provide the dark energy community with state of the art analysis tools.

February 2015

- Weak Lensing: Fast Simulations and Analysis for Blending (David Kirkby)
- Cosmological Simulations: Large-Scale Simulations for Synthetic Sky Maps (Katrin Heitmann *et al.*)
- Cosmological Simulations: Approximate Mass Function Emulator (Katrin Heitmann *et al.)*

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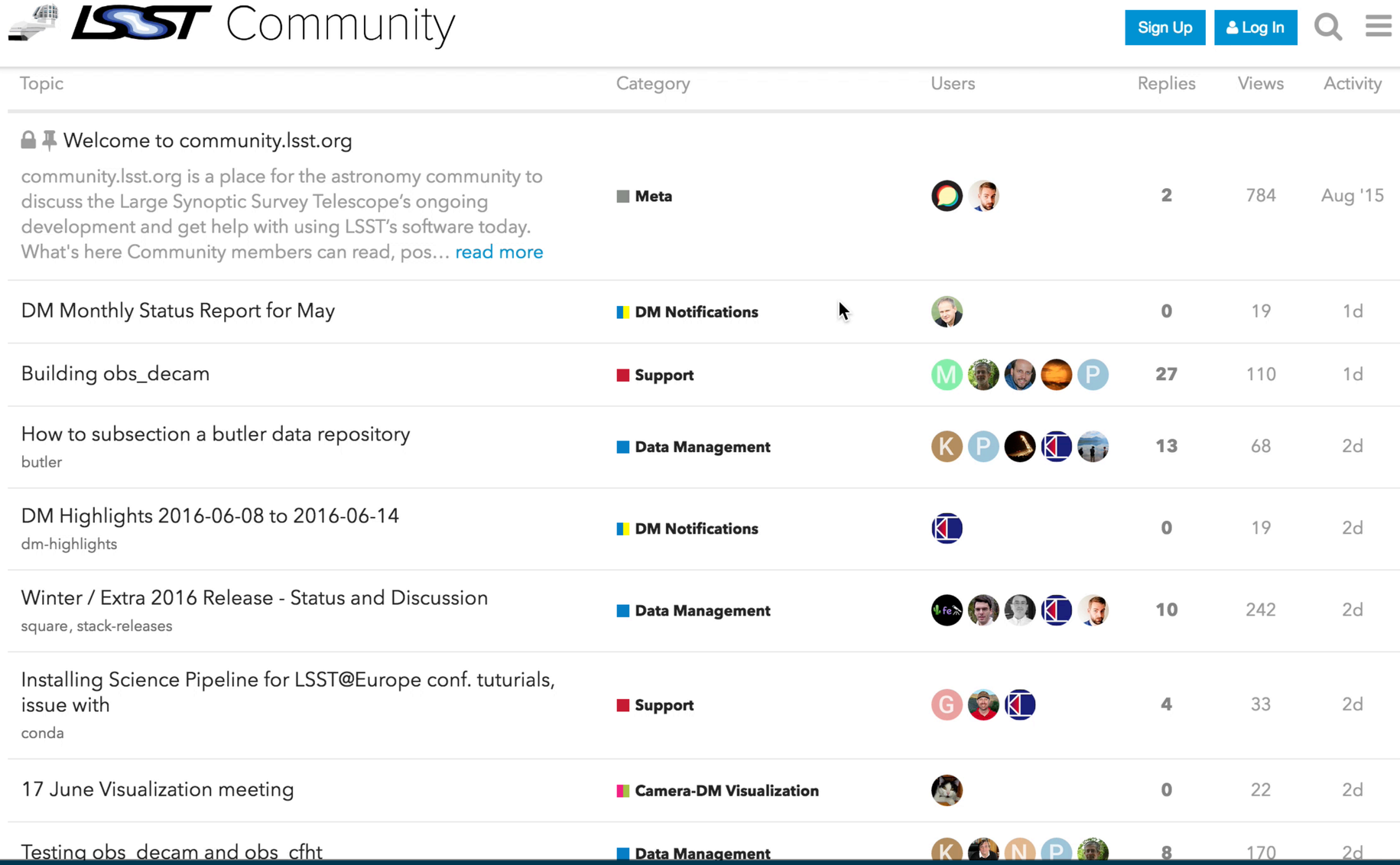

LSST SCC Office Hours

1st & 3rd Wednesdays at
1pm Central US Time
(or by appointment)

bit.ly/LSSTSCC_OfficeHours

Next office hours: October 19th

THE LSST COMMUNITY IS ALREADY ACTIVE AND THRIVING!