

ULLYSES: Hubble UV Legacy Library of Young Stars as Essential Standards

The STScI Director has decided to devote 600-1000 orbits of Director's Discretionary time in observing Cycles 27-29 to a new Hubble Ultraviolet Legacy program focused on **star formation and associated stellar physics**. The Ultraviolet Legacy program will be modeled after the Frontier Fields program: all data obtained will be non-proprietary.

A working group has been formed to engage with the scientific community and provide input that will shape the scientific program. The Working Group is charged with advising the STScI Director on the form and attributes of a final observing program. The Director will take full account of this advice in developing the observing program that will be implemented by STScI for the community.

As part of the process, the working group solicited community input via a survey, with a response deadline of **December 7 2018**. Those responses were taken into account in compiling the final survey recommendations.

Charter

After consultation with the Space Telescope Users Committee and the science community, the Space Telescope Science Institute's Director, Kenneth Sembach, has decided to devote a substantial amount of Director's Discretionary time in observing Cycles 27-29 to a new Hubble Ultraviolet Legacy Initiative centered on star formation and related stellar astrophysics. The primary goal of this initiative is to extend knowledge of the universe through the unique ultraviolet observing capabilities available only with HST. The overall program will serve as the foundation for a legacy dataset on which the astronomical community can build and contribute observational, theoretical, and numerical simulation data and models.

The charge to the Working Group is to identify the most effective strategy for achieving high scientific impact and return for an investment of 600-1000 orbits of ultraviolet observations related to star formation and the associated stellar physics. A program (or set of programs) on this scale presents scientific opportunities that are not ordinarily available through the normal time allocation process. An important component will be the identification of ancillary data and information that can be incorporated in a manner that provides broader access and greater depth to the scientific initiatives identified for this legacy program.

The HST Ultraviolet Legacy Working Group has the following primary tasks:

- Define the overarching science case and a set of science goals for a comprehensive set of ultraviolet observations related to **star formation and associated stellar physics** that advance scientific discovery and provide lasting archival value.
- Solicit input from the astronomical community in defining the science goals.
- Recommend representative suites of observations necessary to accomplish the science goals of this initiative. Prioritize if possible.
- Identify opportunities for coordinated observations over the full wavelength regime with other ground-based and space-based observatories.
- Produce a short (10-15 page) white paper describing the results of the above tasks by the end of January 2019.

The Working Group should take into account both the archival research value of the planned observations and the coordination of these observations with other observatories. The Working Group should also assess how the proposed science program might establish foundational science for the next generation UV/OIR Great Observatory.

The Working Group will consist of approximately 8-10 members of the astronomical community selected by STScI and the Working Group Chair, Prof. Sally Oey (University of Michigan). The Chair of the Working Group will organize the meetings of the Working Group, and STScI will provide logistical (travel, meeting, telecon, etc.) support as needed. We expect that the Working Group will have at least one face-to-face meeting, supplemented by regular telecons and email exchanges.

The Ultraviolet Legacy program will be modeled after the Frontier Fields program. All data obtained will be non-proprietary, as will contributed data and information, which in return will be recognized with appropriate citation and attribution. STScI will identify an in-house team to implement the program and produce high-level data products for dissemination to the community. Opportunities to supplement these core observations and perform archival research will be available through the standard HST Calls for Proposals.

The primary STScI contacts for the Working Group will be Tom Brown (STScI HST Mission Office Head) and Neill Reid (STScI Associate Director for Science). Both will be ex-officio members of the Working Group.

Constituted

August 2018

WG membership

Chair: Sally Oey (Michigan)

Members: Nate Bastian (Liverpool John Moores University), Nuria Calvet (Michigan), Paul Crowther (Sheffield), Andrew Fox (STScI), Jay Gallagher (Wisconsin), Gregory Herczeg (Kavli Institute for Astronomy, Peking University), Ana Gomez de Castro (Univ. Complutense de Madrid), Claus Leitherer (STScI), Christy Tremonti (Wisconsin)

Observing examples

The Working Group has compiled two observing examples, linked below.

1. A UV imaging survey of star-forming regions, clusters and starbursts [example1.pdf](#)
2. A UV spectral atlas of massive stars and clusters at low metallicity [example2.pdf](#)

These should **not** be construed as proposals for specific stand-alone programs, but rather as sets of observations that exemplify the proposed scope of the initiative, highlighting potential aspects of the final science case for a legacy program. Community members are encouraged to develop their own science cases and suggested observations, which can be submitted by e-mail to hstuv@stsci.edu. A crucial aspect of any legacy program is that it must tackle key science questions through observations that are unlikely to be realised through the standard TAC GO process.

Outcome

Report submitted to Director, February 5, recommending the Hubble UV Legacy Library of Young Stars as Essential Standards, the ULLYSES project.

[Executive summary](#)

[Full report](#)

Implementation

The program was announced to the community on March 4 2019. Neither the target list nor the detailed observing modes for ULLYSES have been defined as yet. STScI will constitute an implementation team to work with the community to refine those parameters. All observations will be non-proprietary and available immediately to the community.

We encourage the community to consider submitting Cycle 27 proposals to supplement and complement the conceptual program. Those proposals might include

- Pure parallel programs that take advantage of spectroscopic observations of OB stars in the Magellanic Clouds and/or low-mass T Tauri stars or brown dwarfs in young Galactic star-forming regions;
- Archival or Theory programs that can utilize or supplement the UV Legacy DD observations. We particularly encourage large-scale programs;
- GO/SNAP programs that can complement or supplement UV spectroscopic observations of young stars.

GO programs that are recommended for acceptance by the Cycle 27 TAC have priority over the UV Legacy DD program; TAC-approved observations will not be pre-empted by ULLYSES.

The final target list for ULLYSES will take into account existing datasets, both archival and those that are part of ongoing GO programs.

Implementation team

Implementation team lead: Julia Roman-Duval

Observing technical lead: Charles Proffitt

Data technical lead: Gisella de Rosa

Team members: Alessandra Aloisi, Chris Britt, Ivo Busko, Joleen Carlberg, Will Fischer, Andrew Fox, Alex Fullerton, Bethan James, Robert Jedrzejewski, Sean Lockwood, Elaine Mae Frazer, Talawanda Monroe, Cristina Oliveira, Linda Smith, Tony Sohn, Rachel Plesha, Adric Riedel, Allyssa Riley, Dick Shaw, Jo Taylor, Dan Welty

[Implementation team policies](#)