

FRONTIERS OF ASTRONOMY

AST 202

MW 2:00-3:20pm @ Science Center 1313

Intro

- Who are we?

- Why are we here?

What comes to mind when you think of “Frontiers of Astronomy”?

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Who gets to use the best telescopes in the world?

- Best telescopes
 - => highest quality data
 - => good science!



Everyone wants to use them!
But time is limited ...

So how do people use the Hubble? Who gets to observe?

Space Telescope Science Institute stscigeneric@stsci.edu via wheatoncollege.edu
to Dipankar ▼

📧 Mon, Dec 2, 2019, 4:01 PM



Hubble Space Telescope Cycle 28 Call for Proposals

Release Date: December 02, 2019

Proposal Deadline: March 06, 2020

We are pleased to announce the release of the Cycle 28 Call for Proposals for Hubble Space Telescope (HST) Observations and funding for Archival Research and Theoretical Research programs.

Participation in this program is open to all categories of organizations, both domestic and foreign, including educational institutions, profit and nonprofit organizations, NASA Centers, and other Government agencies.

This solicitation for proposals will be open through March 06, 2020 8:00pm EST. The [Astronomer's Proposal Tools](#) (APT), required for Phase I Proposal Submission, will be released for Cycle 28 Phase I use before the end of the year. Results of the selection will be announced by the end of May 2020.

Thousands of proposals are received from around the world.

We are going to take a similar strategy in this class

- During the semester everyone will propose a few projects that they would like to do with the *Hubble Space Telescope*.
 - We will do a lottery to decide who goes when.
- The proposals are due at least 2 days before the review.
 - Submit on shared google-drive. Email class.
- Also, the proposer gets to defend their proposal on the day of the review.
 - A 10 minute presentation + 5 minute Q&A.
- We then politely ask the proposer to leave the classroom for 10 minutes during which
 - We the rest (i.e. the Time Allocation Committee) discuss the proposal and give grades.

What should a proposal contain

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- 2-pages
- A Title (that attracts attention)
 - An “Introduction and Background” section
 - explain *logically, rationally, persuasively* what you want to do, and why is it important that HST should carry out your proposal.
 - A “Scientific Justification and Description of Observations” section
 - explain the instrument(s) on the HST that you will use to achieve your science goals. You should demonstrate that your proposed project is feasible with the HST.
- 1-page
- Figures/graphs/plots/tables
 - from other peer-reviewed papers strengthening your arguments.
 - A “References” section
 - list of publications that helped you prepare the proposal.

(A proposal template, and few samples from past years are available on onCourse)

Where to get new ideas for proposals?

- Reading current journals, articles, papers
 - Popular journals are great starters, e.g.
 - Sky & Telescope (see link on onCourse)
 - Scientific American
 - Astronomy
 - Online sources
- And then on to the original research for details
 - Nature
 - Science
 - Astrophysical Journal (ApJ)
 - Astronomical Journal (AJ)
 - Annual Reviews of Astronomy & Astrophysics (ARA&A)

Warm up exercise for next class (Jan 27)

- Pick the most exciting astronomy news/article that you recently read.
- Present it to us in 3 slides, in about 7 minutes.
 - Tell us what the main result is, where you read it, and
 - Why it attracted your attention (why you think it is scientifically important)
- The library has excellent resources
 - Sky & Telescope, Scientific American, Astronomy, Nature, Science

Conducting the day-2-day business of peer review

- There will be 3 proposers defending their proposals every class (proposal reviews start in 3 weeks, from February 10th)
- The proposers should have uploaded their proposals on google-drive at least 2 days in advance so that the TAC can read it carefully.
- DM will
 - invite the proposers to give their talks,
 - keep track of time during presentations,
 - lead the questions and discussions sections, and the voting.

Conducting the day-2-day business of peer review

What to do if you are a ...

- Proposer, presenting today
 - You have already uploaded your proposal to google drive 2 days ago, and have emailed the whole class asap after uploading.
 - The proposal should strictly adhere to the formatting guidelines and page limits (no more than 2 pages of text + 1 more for tables, graphs, figures, references)
 - Upload PDF version as lastname_firstname_cycle1.pdf
 - Present your 10min defense and convince us why your project absolutely needs to be done.
 - This is your chance to really hammer your points.
 - And be well prepared for questions from everyone.
 - Leave the classroom while the TAC deliberates on your proposal. Someone will be sent to fetch you when we're done.

Conducting the day-2-day business of peer review

What to do if you are a ...

- TAC member
 - Print out the initial evaluation sheet from onCourse.
 - Read the proposals thoroughly, making notes what you felt were good points, what was unclear, what questions would you like to ask, etc. Give the proposal a preliminary grade out of 10 where 10 is astounding/ground-breaking/must-do, and 1 is poor.
 - Bring your initial evaluation sheet to class.
 - Listen to the proposer's presentation in the class. Revise your initial evaluation, ask questions that were not clear.
 - After proposer leaves, discuss, summarize what you thought were the plusses and minuses. Revise preliminary grade if needed. Vote.
 - Submit your revised notes and grades using the google form

Conducting the day-2-day business of peer review

What role do I (DM) play during the proposal writing and review process

- Once you come up with an idea for a proposal, you should come and talk with me about it.
 - Remember, this is not a homework where there is one correct answer and you have to arrive at it by yourself. Here you are tackling an open problem in astronomy ... pushing the frontier. Often two heads are better than one, and I can give advise/pointers (usually).
- During the TAC meetings DM will be the chair, helping the TAC come to decisions/conclusions by offering technical or science inputs.
 - It is blatantly undemocratic, but the chair's vote weighs 3x that of other TAC members.
- DM will send out the proposal evaluation summaries and grades to the proposers, within 4-5 days of proposal review.
 - Only possible if TAC members submit their final reports on time.

Conducting the day-2-day business of peer review

What role do I (DM) play during the proposal writing and review process

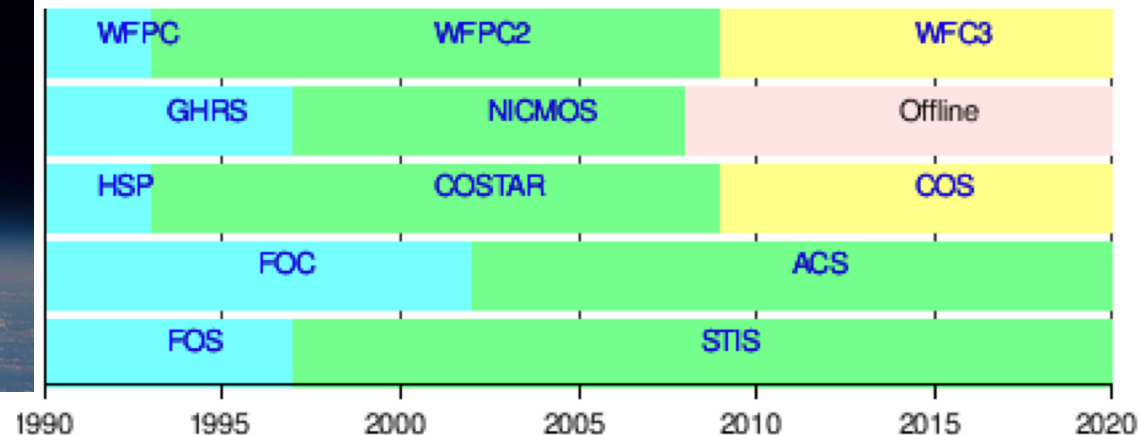
- You will find me in my office (SC 1330) on:
 - Tu/Th --- 2- 4pm,
 - or if found in office and not talking with anyone else,
 - or via email (maitra_dipankar@) round the clock
 - [send a reminder if you haven't heard back in 48 hours]

Which instrument on HST will best for my project?

Instrument teams will present the details on 1/29, 2/03



Instruments on the HST



Date	Presenter(s)
Jan29 WFC3	Jacob & Chett
Jan29 COS	Noah & Benji
Feb03 ACS	Luca & Alexi
Feb03 STIS	Mike & Sri

Tentative Schedule

Date	Agenda	Special remarks
Jan 22, W	Intro, logistics	HST teams to be determined via lottery
Jan 27, M	Warm up: Present an intriguing problem in 7 mins	Also lottery to determine cycle 1 presentation sequence
Jan 29, W	HST Instrument teams present (20 min/instrument)	COS, WFC3
Feb 03, M	HST Instrument teams present (20 min/instrument)	ACS, STIS
Feb 05, W	Proposal workshop: Discuss, work on your proposals	
Feb 10, M	Proposal review cycle 1 - Proposers 1,2,3	
Feb 12, W	Proposal review cycle 1 - Proposers 4,5,6	
Feb 17, M	Proposal review cycle 1 - Proposers 7,8	
Feb 19, W	Discussion panel: Scope(s) for improvement	Last date to decide on a project.
Feb 24, M	Proposal review cycle 1f - Proposers 1,2,3	Revise your proposals and submit/present again.
Feb 26 W	Proposal review cycle 1f - Proposers 4,5,6	Revise your proposals and submit/present again.
Mar 02, M	Proposal review cycle 1f - Proposers 7,8	Revise your proposals and submit/present again.
Mar 04, W	Discussion panel: Scope(s) for improvement	Voice your feedback
Mar 09, Mar 11	<i>Spring Break</i>	
Mar 16, M	Project meetings	Discuss progress on your project with DM
Mar 18, W	Project meetings	Discuss progress on your project with DM
Mar 23, M	Proposal review cycle 2 - Proposers 1,2,3	
Mar 25, W	Proposal review cycle 2 - Proposers 4,5,6	
Mar 30, M	Proposal review cycle 2 - Proposers 7,8	
Apr 01, W	Proposal review cycle 2f - Proposers 1,2,3	
Apr 06, M	Proposal review cycle 2f - Proposers 4,5,6	
Apr 08, W	Proposal review cycle 2f - Proposers 7,8	
Apr 13, M	Discussion panel: Scope(s) for improvement	Voice your feedback
Apr 15, W	Project meetings	Discuss progress on your project with DM
Apr 20, M	Proposal review cycle 3f - Proposers 1,2,3	
Apr 22, W	Proposal review cycle 3f - Proposers 4,5,6	
Apr 27, M	Proposal review cycle 3f - Proposers 7,8	
Apr 29, W	Micro-conference @ Spencer Cafe	Present your projects as posters

(Link is on our onCourse site)




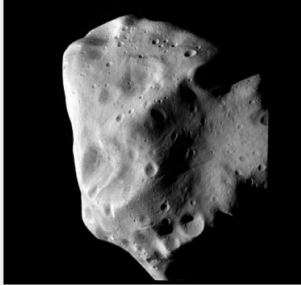



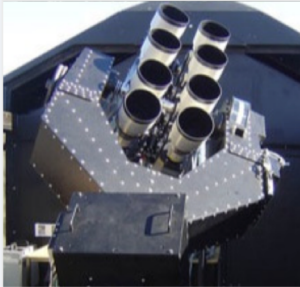






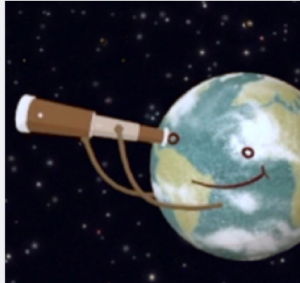
Grading scheme

- 55% of the final course grade will be based on the grades you received for your proposals and presentations.
- 30% will be based on your performance as a member of the TAC.
- 15% will be on the results and presentation of a project of your choice.
 - Project ideas: Build an instrument, write a code, run some existing code to understand the science, do a citizen science project, take some new/archival data and analyze it to show results, *and many more ...*

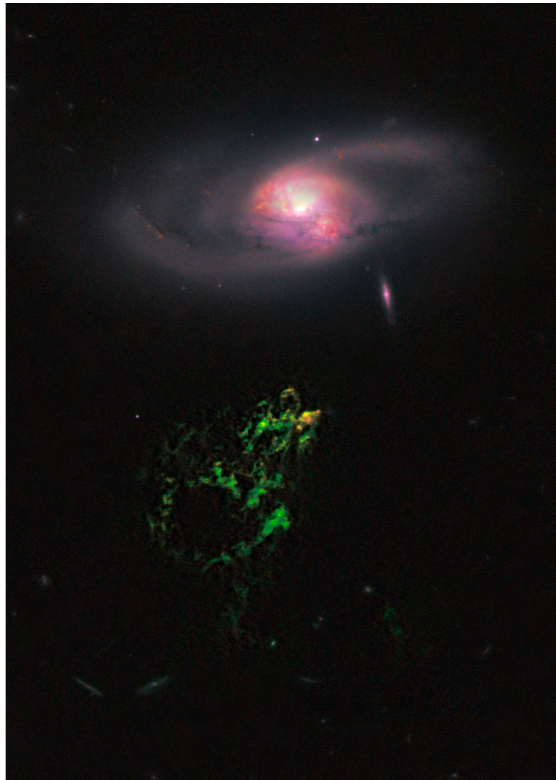
Citizen Science Project

← → ↻ 🏠 zooniverse.org/projects?discipline=astronomy&page=1&status=live 🔍 ☆ 📌 🖼️

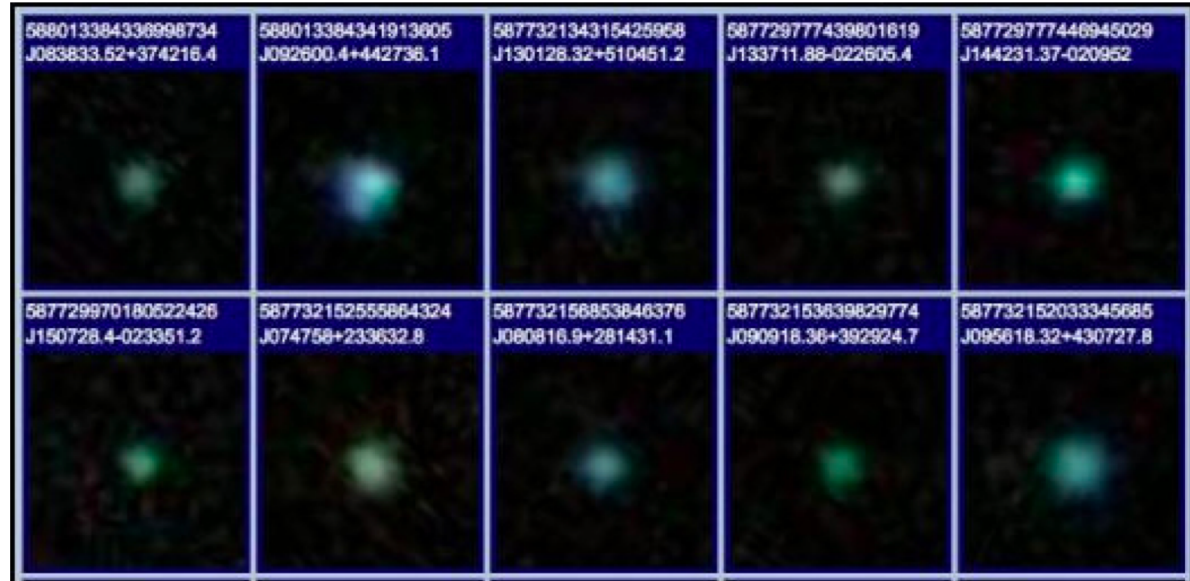
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 <p>Fig. 166. Canis minor Fig. 167. Regulus Vulva Per Stjerne 1 2 3 4 5 6</p>				
MAPPING HISTORIC SKIES	GALAXY ZOO: CLUMP SCOUT	GALAXY ZOO MOBILE	HUBBLE ASTEROID HUNTER	MUON HUNTERS 2.0
				
ZWICKY'S QUIRKY TRANSIENTS	COSMIC	SUPERWASP VARIABLE STARS	VARIABLE STAR ZOO	GALAXY BUILDER
				

Citizen Science Discoveries



Hanny's Voorwerp
(Source: W. Keel; HST/WFC3)



Green Pea galaxies
(Source: Carie Cardamone)

Maybe you will discover something new to!!!

Project showcase poster presentations on the last day of classes (Apr 29).