

# Announcements

Homework 3 due May 7 (next Tuesday)

- If you need help **come to office hours** or schedule a time to see me!!
- If you still don't have sextractor working, email me and I can send you the catalog.
- If you still don't have CIAO working, come talk to me.

I will likely combine homework 4 (proposal feasibility) and homework 5 (databases and stats) into one longer homework.



# Proposal Writing



# Observing Proposal Overview

**Proposal timescales:** NASA telescopes typically have a one year proposal cycle, ground based optical telescopes and NRAO have proposal deadlines twice per year.

XMM (Oct), Suzaku (Dec), Fermi (Jan), HST (Feb/March), Chandra (March), Keck and NOAO (Sept/March), NRAO (Aug/Feb)

**Why write proposals:** 1) You have a good science question you want to get answered. 2) You need money

**Oversubscription rates:** something like 5:1 for major facilities

➡ You need to make a strong case for your proposal!!!

➡ You can spend a lot of time writing proposals!

Once you get the observations you need to do the project. Make sure it is a project you want to do before you propose.



# Know Your Audience

**NASA Satellites/National Facilities:** review panels are broken up by subject area. The reviewers will also be familiar with the wavelength and instruments you are proposing to use. You still need to convince them your topic is important, but you can assume some background knowledge. Think of going to a small topical conference.

**Ground-based, institutional facilities:** reviewers will likely be members of your institution and will be familiar with the telescopes, but may or may not know about your science area.

**NSF, NASA (not telescope specific), DoE:** reviewers also selected based on science area, but typically have broader backgrounds. These are also longer proposals. More background/intro material and need to sell proposal in a broader context.

**Fellowships:** assume a very broad background of reviewers.



# Before You Propose

- Formulate an idea
- Check the archives for existing observations (reviewers will get a conflict list of existing observations with similar facilities)
- Check target visibility (particularly for ground based telescopes)
- Do a rough feasibility, exposure time estimate

## Some thoughts on proposal topics:

Time on major telescopes is expensive and very oversubscribed. There is an unfortunate tendency to select proposals with guaranteed results. Risky proposals even if they are potentially high impact can be hard to get approved.



# Sections of a Proposal

- Abstract
- Introduction\*\*
- “the Meat” – proposed observations and target selection, specific science goals (one or more sections)
- Feasibility\*\*
- Other possible sections:
  - Budget Justification
  - Science Team
  - Timeline

The introduction and the feasibility are the most important components of a proposal. You need to convince reviewers both of the importance of the science and that you can achieve your goals.



# Sections of a Proposal

- **Abstract:** a concise summary of the proposal. Unlike papers you should summarize both the science goals and the methods to be used. Try not to copy and paste text from the science justification, though this can be hard to resist.
- **Introduction:** Layout the science case and necessary background to the proposal. This should give the “big picture”, layout open questions (which you will answer!), but also give a concise summary of the proposed investigation.
  - Strongest proposals will pose a question and then show that they will answer it.  
(If you can present two competing models and show that you can discriminate between the two that is also great.)
  - By the end of the first page reviewers should know what you will do and why it is important.



# Sections of a Proposal

- **“the Meat”**: section or sections describing the specific proposed program, including the observations proposed, the measurements to be made, the target selection, the appropriateness of the targets and instrument, and the specific science goals. Describe existing multiwavelength data, particularly if needed to meet science goals.
- **Feasibility**: specific estimates of the exposure time and instrument setup needed to meet the stated science goals. Include a description of the method used, assumed flux and spectrum of the source, etc. so that proposers can reproduce your estimates. For faint or extended source be careful about backgrounds.

The feasibility need not be long (depending on the complexity of the observations), but it is essential! If reviewers are not convinced you can make the measurements or get the accuracy you state, they will not approve your program.



# Other Thoughts

- Proposals will be read in a hurry, so make it easy.
  - Don't try to squeeze things in to length limits.
  - Use white space, bullets, boldface (sparing) to highlight major points. For longer proposals include a timeline of the work.
  - Repetition is OK
- Be consistent: any numbers quoted, abbreviations and terminology should match throughout the proposal.



# Other Thoughts

- For telescope proposals, justify why the telescope/instrument you are proposing for is the best choice.
- If there are existing observations justify why new observations are needed.
- In some cases your observing time may be cut or only part of your sample recommended for observations. Rank your targets accordingly. You may also want to discuss which science goals and measurements can be made with different observing times or sample sizes.
- If you may not detect your source (e.g. you are proposing to observe something of unknown flux), justify why a non-detection would be interesting, allow you to rule out models.



# Specifics on Class Proposals



# Proposal Types

Observatories have a range of proposal types depending on observation length etc. For our class, your proposals can be:

**GO (General Observing):** new observations. We will not distinguish large and regular. However, you may not ask for more than 1 Msec of Chandra time or 100 orbits of Hubble time (100 x 97 minutes)

**Archival Proposals:** proposals to use data already in the archive. The proposal should address science that is different from the original use of the data and/or combine archival data for a number of different observations/targets.

**Target of Opportunity (TOO):** triggered observations

We will not have a specific category for **joint observations** with other facilities. For our purposes, you can assume you have whatever multiwavelength data you would need, but you must discuss these in your proposal.



# Proposal Format

**Scientific Justification:** (the only part required for the class)

**Page limits:** 4 pages

(actual limits for HST/Chandra depend on proposal type)

Page limits include references and figures. Minimum 11pt font and 1 inch margins.

There is a latex template here: <http://cxc.harvard.edu/proposer/> under "Observing Proposal Preparation and Submission". This is not required, but may be helpful.



# Additional Proposal Elements for Typical Proposal

## Web forms:

- General form with info on PI, collaborators, etc.
- Target forms. Info on the instrument set-up, source brightness, position, etc.

**Previous Chandra/HST Programs** list of previous successful proposals and their results. Not typically a large part of the review process, but if you have a history of not publishing data this may count against you.

**Budget:** if accepted, but sometimes you need to submit an estimate with the science proposal

**PI's CV, Management plan, Coordinated Observations, ...**



# Your Proposal – Getting Help (Chandra)

**Proposer's Observatory Guide:** <http://cxc.harvard.edu/proposer/POG/>

**Call for Proposals:** <http://cxc.harvard.edu/proposer/CfP/>

## **Feasibility:**

**PIMMS:** Tool for count rate estimation, <http://cxc.harvard.edu/toolkit/pimms.jsp>

**Webspec:** Tool for spectral simulation, <http://heasarc.gsfc.nasa.gov/webspec/webspec.html>

**Threads, visibility tools:** <http://cxc.harvard.edu/proposer/>

**Archive:** <http://cda.harvard.edu/chaser/> and <http://heasarc.gsfc.nasa.gov/docs/archive.html>



# Your Proposal – Getting Help (HST)

## Instrument Handbooks:

[http://www.stsci.edu/hst/HST\\_overview/documents](http://www.stsci.edu/hst/HST_overview/documents)

## Call for Proposals:

<http://www.stsci.edu/hst/proposing/documents/cp/toc.html>

## Phase 1 Roadmap:

<http://apst.stsci.edu/apt/external/help/roadmap1.html>

## Feasibility:

Exposure time calculators: <http://etc.stsci.edu/etc/>

Duplication checking: <http://archive.stsci.edu/cgi-bin/duplication>

Archive: <http://archive.stsci.edu/>