Proposals and other scientific writing

Always have a plan

- What are you trying to achieve?
- Who is your audience?
- What do you need to do to convince them?

Observing proposals

- Objective: to get the observing time we're asking for
- Audience: the time allocation panel, who probably know a lot about the telescope and a little bit about your science; and (maybe) expert referees.
- Convince them by: clearly explaining the purpose and outcome of the proposal and making them think the science is exciting and feasible

Boxes to tick

- Introduction: what's the general science question? (references; panel are not experts!)
- Specific goals: what do we want to observe?
- *How will this help us answer the science question?* (often good to be testing a model)
- Why are your new observations the best way of tackling this question? (Why can't you use surveys, telescope archives, different observations...)
- Are the observations actually technically possible? (check this *before* you start writing)

Common mistakes

- Failing to introduce the science question at all because you assume everyone knows it already
- Failing to link your proposed observations to the science question
- Failing to explain what you will do with the data
- Failing to show that yours is a good approach and/or will lead to progress
- Failing to check that the observations are feasible, and haven’t been done already

Workshop: example proposals

- Read the two example proposals in `~/Zambia_2018/proposals/`
- Do they satisfy all the criteria for a good proposal?
- Could they be improved?

Observing proposals: some practicalities

- Telescopes usually issue a ‘call for proposals’ which tells you about the capabilities on offer *and the closing date*
- E.g. NRAO proposal deadline is on known dates (~1st Feb, 1st August)
- Proposals do not have to be submitted at the last minute!
- Writing is often better if not under time pressure, and you can get advice from colleagues

Observing proposals: some practicalities

- Make sure your time request is reasonable compared to the amount of time available
- Often the call for proposals will say the total time that can be allocated
- If you need a lot of time, best to start small with a ‘pilot project’ if possible
- Information about the telescope’s oversubscription rate may help you figure out what you can get away with

Observing proposals: some practicalities

- Proposals usually have page limits and may have other restrictions about font sizes or margins
- If a template is provided you should use it
- Ideally get hold of an example of a successful proposal and imitate it (but no plagiarism!)
- Get advice from someone with a track record of success – and maybe ask them to join the team. Panels look at proposers' records.

Observing proposals: some practicalities

- Usually there will be a web form to go with the proposal with details of targets and observing setup
- This varies from telescope to telescope
- It can be complicated to fill in, so don’t leave till the last minute
- Get it wrong and your proposal may be rejected on technical grounds

Review

- There will always be a time allocation panel; there may also be external referees
- e.g. MERLIN: panel asks for referee reports and then ranks science and allocates time
- e.g. NRAO: there are standing subject panels (e.g. for AGN) across *all* NRAO telescopes for ranking within areas and then a time allocation panel that allocates time
- e.g. Chandra, XMM: there are ad hoc subject sub-panels (new each year) and then a panel chairs' meeting where the rankings are harmonized
- Review can take a long time especially with heavily oversubscribed instruments

Other types of proposal

- Observing proposals are a great way of improving your proposal skills
- Later in an academic career you may need to write fellowship proposals, grant proposals…
- All have the same basic checklist:
  - What's the question?
  - What do you want?
  - Why will it help you answer the question?
  - Why is this the best way to do it? (Why are you the best person to do, or supervise, the work?)
  - Can you do what you say you're going to do?

Exercise

1) You want to observe a continuum source which has a flux of 2 mJy in FIRST. You believe it is resolved on scales < 1 arcsec and you assume it has a standard spectral index of 0.7. What telescope do you propose to use?

2) You are searching for faint radio emission from a cluster of galaxies on scales of arcminutes. The source is undetected in NVSS and is too big for FIRST. You expect the spectrum is steep (i.e. source gets fainter rapidly with frequency). What archive/survey should you try next? What telescope(s) might you propose for?