Submitting a GBT Proposal

2021 Winter Observer Training Workshop
Before you Begin

- Read the call for proposals in detail
- Understand the telescope and its capabilities
- Ask yourself...
  - Why is this proposal worth doing? Put yourself in the shoes of a critical referee
  - Has this been done before? What will I do differently this time?
  - Is this the right telescope for my science?
  - What do I actually need (as opposed to want) to accomplish my scientific goals?
Proposal Categories

- **Regular**
  - 0.3 – 8 GHz (any weather): < 400 hours and <= 1 year
  - 8 – 18 GHz (good weather): < 200 hours, <= 1 year
  - 18–27.5 / >50 GHz (excellent weather): < 100 hours, <= 1 year
  - Fixed time / monitoring (all weather): < 200 hours, <= 1 year

- **Large**
  - 0.3 – 8 GHz (any weather): >= 400 hours and > 1 year
  - 8 – 18 GHz (good weather): >= 200 hours, > 1 year
  - 18–27.5 / >50 GHz (excellent weather): >= 100 hours, > 1 year
  - Fixed time / monitoring (all weather): >= 200 hours, > 1 year
Proposal Categories

- Triggered proposals are submitted at the normal proposal deadlines
  - Intended for pre-planned observations of transients whose times are not known *a priori*
  - Must include clear, well-justified trigger criteria
- Director’s Discretionary Time (DDT): Two types
  - Target of Opportunity: Unexpected phenomena, rapid response
  - Exploratory Time: Typically a few hours or less, intended for pilot projects taking advantage of a new idea or capability
Great, Good or Poor

- 300-500 proposals reviewed every deadline
- Few (~10) are obviously great
- Few (~10-20) are obviously poor
- All others are good and about equal
  - We are all intelligent, good writers, etc.
- How do you make your proposal standout?
Proposal Elements

• Abstract (on the cover page) – limited to 200 words for GBT proposals
• Introduction and background information
• Project description
• Scientific justification
• Time request (including backends, observing strategy, etc.)
• Technical justification (pre-formatted)
Scientific Justification Tips

• Do
  – Be thorough but concise – this is a skill that takes practice to develop!
  – Provide a relevant introduction
  – Cite relevant literature
  – Discuss the potential impact of a successful proposal
  – Discuss the potential impact of a null result

• Don’t
  – Assume that all referees are experts in your domain
  – Don’t “blind with science” - KISS
  – Use words when a figure would suffice (and vice versa)
Technical Justification Tips

• Do
  – Make sure you are up-to-date on instrumental availability and capabilities
  – Ask observatory support staff if you have questions
  – Provide all the information that is asked for
  – Use observatory provided tools
  – Be explicit about any assumptions you are making

• Don’t
  – Ask for something that is unavailable or impossible
  – Ask for an instrumental set up that is not justified by the science
  – “Pad” the time request – we conduct an independent review
Stylistic Considerations

- Don’t repeat the abstract in the proposal – it is included in the cover sheet! The same goes for technical justification.
- Don’t add content just to reach the page limit.
- Follow all formatting guidelines
  - 4-page limit for regular, triggered, DDT proposals
  - 10-page limit for large proposals
  - Includes figures, tables, references
  - All proposals: Min. 11 point font for main text (smaller font OK for figures, footnotes, but must be legible)
  - All proposals: 1-inch margins
- Remember that referees read lots of proposals – make it exciting.
GBO/NRAO Proposal Call

- August 1 and February 1 deadlines
- August deadline observing February-July
- February deadline observing August-January
Hidden Gems

• Joint proposals with
  – Hubble
  – Fermi
  – Chandra
  – Swift
  – SOFIA
• Filler time proposals
GBO/NRAO Tips

- Panel Based system
  - Eight different panels
  - Broad community representation on panels
  - Non experts on panels

- 0=best and 10=worst
- Will be given a group
  - A: active for one year, expect to complete
  - B: one semester, should get most of time
  - C: one semester, filler time
  - N: not accepted
GBT Tips

• If in doubt contact us
• Technical justification – unlimited space
  – What you are using
  – How you are using it
  – How long you need it
  – How you determined those values
• Include Overhead times
  – Pointing/focus every 0.5-2 hours
  – AutoOOF every 1-2 hours (above 30 GHz)
  – Interscan latencies
    • Slew times
    • 20-30 seconds to start scan
Common Mistakes

• Confusion Limit
  – Once you hit it you are done (unless you have knowledge of emission at higher resolution)
• 1/f noise (Gain variations)
  – Receiver dependent
  – Relevant when product of BW and tint exceeds certain limits
• RFI
  – Check for known emissions
  – Have a plan
• Use the GBT sensitivity calculator
• Use the GBT mapping calculator
  – http://www.gb.nrao.edu/~rmaddale/GBT/GBTMappingCalculator.html
Sessions

- Only include receivers and backends that must be observed at one time

- Typical telescope period is 3-6 hours long
  - Scheduled using average RA and Dec of sources
  - Group sources accordingly

- Sources in a sessions should be:
  - Within a 2-3 hour RA range
  - Use $\lambda=\delta$ as a divider (avoid long slews)
  - Time visible should be the same to within 1-2 hours

- Don’t restrict observable LST range too much
  - More flexibility = better chance to be scheduled
Scheduling Considerations

• GBT is oversubscribed, particularly when Galactic center is up
  – If you can, ask for time that is in lower demand
• Fixed projects are becoming harder to schedule!
  – This especially impacts pulsar and VLBI observing
  – If you need **fixed** or **windowed** observations you must provide strong justification (and rank highly)
  – Be as flexible as possible with scheduling constraints
  – Make your “must-haves” clear and different from your “prefer-to-haves”
Important Websites

  - Links and information for all things related to GBT proposals

- https://my.nrao.edu
  - Primary portal for submitting all GBO/NRAO proposals

- https://dss.gb.nrao.edu/calculator-ui/war/Calculator_ui.html
  - Tool for calculating observing time and sensitivity

- https://www.gb.nrao.edu/~rmaddale/GBT/GBTMappingCalculator.html
  - Tool for planning maps