The Federal Grant Writing and Reviewing Process

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1. Welcome and Research Grants Overview
Description of Research Opportunities in Space and Earth Science (ROSES NRA), program types, pathways

2. Guidebook for Proposers
A practical introduction to writing proposals to the ROSES NRA

3. Peer Review Process
A guide to panel assembly, deliberations, and evaluations

4. Wrap Up and Discussion
Take home messages

• The best way to learn to write proposals is to write them. Start early — when not getting funded doesn’t matter.
• The Program Officer/Point of Contact is the interface between the funding agency and you. Call them or email them with questions.
• Request a debriefing on unsuccessful proposals.
• Don’t annoy your reviewers!
What does the pot of money at NASA look like?

• NASA is the premier funding agency for Earth and space science research
  – ~$600M annual R&A* budget with >50 R&A programs
  – Each program has anywhere from $1M-$10M available each year
  – Research also funded through operating missions

• NASA’s science research programs are managed by the Science Mission Directorate (SMD, led by the AA*), which has 4 science divisions (led by the DDs*)

• All NASA R&A funding is offered through the Research Opportunities in Space and Earth Science (ROSES) NRA*
  – ROSES is released annually and describes all SMD R&A opportunities

• ROSES is divided into two parts
  – Summary of solicitation: describes the overall opportunity and gives proposal and submission information
  – Appendices: one per division plus cross-division listing all programs

*AA = Associate Administrator
*DD = Division Director
*NRA = NASA Research Announcement
*R&A = Research and Analysis
So how do I get the money?

Define your research topic → Read ROSES → Pick program

Refine your research topic → Think through your proposal → Write, Critique, Write

Submit Proposal → Peer Review of Proposals → Selection of Proposals
Proposal Writing: Guidebook for Proposers

A practical introduction to writing proposals to the ROSES NRA

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NASA is looking for two things from proposals:
1) To fund research of high scientific quality
   – Relies on Peer Review
2) To ensure the research will further NASA’s objectives and verify the funds will be used properly
   – Relies on Discipline Scientist

So there are two audiences reading your proposal.
Your job is to make it as easy as possible for these two audiences to select your proposal!
What you should expect...

- What will not happen:
  
  You will not write a great piece of literature
  
  You will not definitively answer the grand question plaguing the community
  
  Your audience will not review your proposal in a quiet, uninterrupted setting
  
  Your audience will not be world experts on your topic
  
  Your audience will not accept your approach without question

- What will happen:
  
  You will write a focused, no frills document
  
  You will answer a focused, well-posed question of limited scope
  
  Your audience will quickly review your proposal amid the chaos of their own life
  
  Your audience will be colleagues from similar fields
  
  Your audience will be skeptical and critical
What the Review Panel wants...

The Review Panel is primarily interested in the scientific merit of the proposal

1. Why should the Review Panel care?
   • Pick a compelling & appropriate topic of proper scope

2. What’s the point?
   • Describe the objectives and end result of the work

3. What are you doing?
   • Describe your methodology and identify your assumptions
   • Provide a detailed workplan describing who does what and when

4. What are the weaknesses? Strengths?
   • Scientific merit, relevance, cost
   • Anticipate questions and answer them

5. How does it all fit together?
   • Logically link the objectives, methodology, and anticipated results to one another and to NASA’s objectives
The Discipline Scientist is primarily interested in the programmatic merit of the proposal

1. Is this proposal appropriate for the program?
   • Read the NRA and respond to it

2. Does the proposal contain high quality science?
   • Peer Review rating must be Good or higher

3. Can the program afford it?
   • Do not “supersize” the proposal
   • Organize proposal into discrete tasks

4. Does this proposal further NASA’s objectives?
   • Link proposal objectives to NASA objectives

5. How will the money be spent?
   • Provide a detailed budget with proper justifications

6. Does the proposal contain all required information?
   • Follow the Guidebook for Proposers!
Where you should start...

- **Guidebook for Proposers**
  - Available at NSPIRES website: [http://nspires.nasaprs.com/](http://nspires.nasaprs.com/)
  - Tells you what information the proposal needs to be selected
  - Tells you how to present that information to make the job of the Review Panel and Discipline Scientist easier

- **Service and Advice for Research and Analysis**
  - [http://nasascience.nasa.gov/researchers/sara](http://nasascience.nasa.gov/researchers/sara)

- **Never guess! Call the Discipline Scientist for clarifications and questions**
  - sara@nasa.gov
Suggestions: Before you start writing...

- Sit down, think through, and plan the research before writing the proposal.
- Demonstrate the feasibility of the approach, especially if looking for something new or in a new way.
- Stay focused – avoid “supersizing” the proposal.
- Ignoring weaknesses will not make them go away; burying them with irrelevant details will not hide them.
- Even though you give good LPSC talks, you can't expect the review panel to remember those talks or give you credit for them. Review panel reviews the proposal, period.
- Proposals not in the “mainstream” may have a greater burden to show compelling nature of feasibility.
Suggestions: When you are writing...

• Write clearly and simply – avoid hyperbole
• Organize the proposal well and follow the Guidebook for Proposers
• Provide the reader with clear signposts throughout the proposal
• Thoroughly review and cite the relevant literature
• Use graphics and tables effectively for impact
• If you are proposing multiple tasks, explain the interrelationship among them
• State if you are proposing the same research to two or more programs
• Provide detailed budgets for all CoI’s, subcontractors, etc. with a narrative summary and justification
• Transparency: don’t try to sneak things in the budget
• Justify travel – why are those 4 conferences/year needed? Who is going? Why are you requesting page charges in year 1 when there are no papers planned in the work plan for year 1?
• If the proposed research is related to research funded by or proposed to another program or agency, be exquisitely clear on which part of the research will be funded by each fund source

Suggestions: And don’t forget to include…
When you are not selected...

- If you simply must fire off an email to the Discipline Scientist questioning their intelligence and integrity and that of the review panel, write it and email it to yourself.
- Remember that R&A programs are very competitive and you often have to submit multiple times.
- After you receive your review, arrange a debrief with the Discipline Scientist to answer any questions.
- Contest the review if you feel that major mistakes were made.
- Always use the comments from the Review Panel to improve your proposal before proposing again.
- Agree/Volunteer to serve on Review Panels.
Suggestions:
When you are selected...

- Serve on a review panel
- Stay in touch with the Discipline Scientist regarding funding receipt
- Submit your Progress Report on time
- Plan far ahead if you have a critical deadline for receipt of funds
- Invite the Discipline Scientist to your talk/poster
How your money will get to you: FY15-16 as an example

- **ROSES-2015 Released**: ~ 14 Feb 2015
- **Step-1s Due**: NET Mar 2015
- **Step-2s Due**: NOIs + 2 mo or 60 days from release
- **Review**: Props + 2-4 mo
- **Selection Decision**: Release $ in RAPTOR
- **Award Paperwork Complete**: Selection + 2 wks
- **Grant?**: HGAO Starts Award
- **Send $ to Ctrs, Feds**: Variable, add 1 to 6 wks
- **Individual Programs' FY16 Budgets Set**: ~ 1 mo
- **Congress debates**: Repeat until approved
- **NASA submits Op Plan**: As late as 13 mo after President's Request
- **Congress debates more**: Appropriation or Year-long CR

**End of FY15** 30 Sept 2015

**President's 2016 Budget Request**: Mar 2015

**Congress debates**

**Continuing Resolution**

**Congress debates more**

**Appropropriation or Year-long CR**

- **As late as 13 mo after President's Request**
- **Repeat monthly, weekly or daily!**

**STOP**

**Congress Governor**

**Approve Progress Report**

**NASA Completes Award**

**~ 1 mo**

**Receive Progress Report**

**Approve Progress Report**

**President's 2016 Request**

**Congress debates**

**Repeat monthly, weekly or daily!**
Proposal Writing: Peer Review

Everything you ever wanted to know about Peer Review, but were afraid to ask...

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Why Peer Review?

• It’s the best (okay, really the least bad) system for choosing exciting, relevant, high-quality research to fund

• Combines expert advice on particular topics with general programmatic direction

• NASA (& the government in general) is committed to open and fair competition for research and mission funding
• Peer review only works when people are willing to do their share.

• Many people in our community went above and beyond “their share” this and every year
  – Serving on multiple panels, sometimes practically back-to-back
  – Completing a dozen or more external reviews
  – Dropping everything to do “emergency reviews”

• We would love to acknowledge you publically for your service, but panels are confidential. We do notice and we do appreciated it.
Peer Review: How does it work?

- Discipline Scientist chooses panel members and chair(s) from science community
  - Identities of panelists kept secret
- Conflicts of interest, even potential ones, are avoided
  - Long-time collaborators, students, & persons at same institution as PI & Co-Is
- Panelists meet for 3-5 days to discuss proposals
- External (aka mail-in) reviewers may also be used
- Large panels may be split into sub-panels
  - Plenary sessions may be used to ensure consistency
- During peer review, Discipline Scientist ensures all evaluations are fair, unbiased, and independent
  - Dog Show Rule: Proposals are not to be compared to each other by review panel
Peer Review: What does a review panel do?

- Prior to the panel meeting, each proposal is assigned at least 2 — usually 3 to 4 — panel members to read it in detail
  - All reviewers are knowledgeable about topic of proposal although both may not be experts
  - All reviewers independently write a draft review before coming to panel meeting
- At the panel meeting, they lead panel in discussion of proposal, including their reviews and the external reviews
- Essence of discussion captured in panel evaluation in terms of strengths and weaknesses in evaluation factors and a grade is assigned
Peer Review: The Process

1° Reviewer Summarizes Proposal Goals → 1° Reviewer Presents Her Comments → 2° Reviewers Present Their Comments → 1° Reviewer Presents Any Mail-in Comments

Panel Reviews Draft → 1° ReviewerDrafts Panel Review → Panel Votes

Panel Votes → Panel Discusses Proposal

Final Review & Approval

Either/Or
Peer Review: What are the evaluation criteria?

- **Scientific/technical merit (including qualifications of team)**
  - Are the stated scientific goals compelling? How much will the proposed research program advance the field if successfully executed? Can the proposed research program achieve the stated goals on the proposed schedule? Does the proposal acknowledge potential pitfalls and propose alternatives? Does the team have the necessary expertise?

- **Programmatic relevance (judged against the text of the NRA)**
  - How effective is the proposal’s claim of relevance? Assuming everything works, would the results be relevant to the program?

- **Realism and reasonableness of costs.**
  - Are the resources requested (FTEs, travel $, supplies, etc.) appropriate for the proposed research program? Are the amounts of resources requested realistic given the panelists experiences as researchers? Is the budget clearly described and justified, including all major sub-contracts or sub-awards?

- These criteria are assessed *independently* of one another, and a low rating in any one is cause for non-selection.
Evaluation Criteria: A little more on Cost & Relevance

- **Relevance**
  - Criterion is a little complicated for most reviewers.
  - The panel evaluates how well the proposal justifies its relevance to NASA & the program.
  - The panel’s judgment of the relevance of the proposed work, independent from the stated justification, can also be communicated to the Discipline Scientist.
  - Importance varies by program — sometimes it’s really binary.

- **Cost Reasonableness**
  - “Cost reasonableness” is not really “bang for buck” (you do NOT see salaries or overhead for NASA ROSES16).
  - Reviewers do not evaluate the “bottom line”:
    - It is not up to the panel to decide that a proposal “costs too much” - that’s the Discipline Scientist’s job.
    - PIs can’t really control their overhead rates, so it is not be evaluated.
Evaluation Criteria: Strengths, Weaknesses, and Grades

• For each evaluation criterion, reviewers keep track of strengths & weaknesses
• Strengths & weaknesses are classified as major or minor
  – Some major weaknesses are fatal flaws that render a proposal non-selectable
• These strengths and weaknesses form the basis of a grade for the proposal
  – There is no precise calculus when assigning grades; for example, a minor weakness does not necessarily cancel out a minor strength and not all major weaknesses are equally “major”.
  – In the end, the grades are based on the judgment of the panelists weighing all the strengths and weaknesses.
• During peer review, Discipline Scientist ensures all reviews are fair, unbiased, and independent
  – Proposals are not to be compared to each other by review panel
• Discipline Scientist integrates findings of panel with programmatic and budgetary considerations
  – Program balance is an important factor
  – Budgets and time commitments are reviewed
• Discipline Scientist formulates list of recommended selections and submits to Selection Officer for approval
Panel Etiquette: Panel Review Requests

- Please respond as soon as possible.
  - If you need to check with your boss or spouse, or try to reschedule commitments, etc., please respond and let us know when you think you might have an answer.
- If you can’t travel, let us know that you would be willing to be a virtual panelist
- If you can’t commit to the panel, let us know if you are willing to do external reviews.
Panel Etiquette: External Review Requests

• Please respond via NSPIRES
  – Emails get lost in our inboxes too
  – Please do so as soon as possible
  – Note: you can still decline individual proposals even after accepting the review assignment
  – Please make sure that NSPIRES emails don’t go to SPAM

• What to do if you have been assigned too many proposals
  – Contact us and let us know.
  – Consider how many you can reasonably handle and ask us to prioritize.
Panel Etiquette: Confidentiality

Can I tell my boss? Officemate? Partner? What if they are a PI/CoI/Collaborator on a proposal?

- Boss is okay, you probably need their permission to attend. Confidentiality applies to them too.
- Officemate is probably going to notice you printing off a dozen proposals, studying them furiously, then disappearing for a week, but “don’t ask, don’t tell”.
- Partner/spouse – this is okay too, we don’t expect you to lie to your partner or disappear for a week without telling them.
- Regardless, what happens at a panel stays at a panel, don’t discuss panel attendance or discussions once you leave.
Panel Etiquette: Confidentiality

- Since the panel is nearby – is it okay if I meet up with my grad school buddy for a drink? How about my cousin?
  - If they are a member of the planetary community, this is not really okay. If you do meet up with them, please be discrete, don’t invite them to the hotel or to dinner with other panelists.
  - If they are not a member of the community, no worries.

- Can I list panel service on my resume?
  - “I have served on PSD ROSES review panels” is fine.
  - “I served on Cosmo (2009), PGG (2011), and LASER (2012, group chief)” is not a great idea.
Panel Etiquette: Confidentiality

• Social Media
  – No, talking about reviewing proposals or serving on panels on social media isn’t okay. Using “(Redacted)” instead of saying “panel” or “proposal” still isn’t okay – you’re not fooling anyone.
  – Location tags – even if your post isn’t about the panel, if your post notes your location, this can be problematic. “Hey, what are you doing in Dallas this week?”
  – Group photos – “here is a pic of me and four other geophysicists who live all across the country and we all just happen to be hanging out in front of the Washington Monument right now for no reason whatsoever.”
  – Even selfies or landscape photos – true story, someone posted a lovely sunrise photo from a morning jog and a friend commented – “hey I recognize that running path, you’re at Landsdowne this week”
Proposal Writing: Last points

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If you remember nothing else, remember this:

• The opportunities are available: find them, learn them, make them yours
• Follow the Guidebook for Proposers and read the NRA for the program
• Your job is to make it as easy as possible for your two audiences to select your proposal
• Think before writing, critique before submitting
• Peer review levels the playing field – use it to your advantage
• It is never too early to start gaining proposal experience
• **NASA Earth and Space Sciences Fellowships**
  – The purpose of NESSF is to ensure continued training of a highly qualified workforce in disciplines needed to achieve NASA’s scientific goals
  – Planetary Science proposals are due early February each year via NSPIRES

• **NASA Postdoctoral Program** ([http://npp.usra.edu](http://npp.usra.edu))
  – Provides NASA Centers with the responsibility to identify candidate postdoctoral opportunities that meet one or more of the following objectives: (a) conduct cutting edge scientific research consistent with NASA’s and SMD’s strategic objectives; (b) recruit the finest early career scientists for short-term, focused research opportunities; and (c) infuse new skills into, and revitalize, both new and existing research groups.

• **Early Career Fellowship**
  – Established to facilitate the integration of new discipline researchers into the established research funding programs and to provide tools and experience useful when searching for a more advanced (*i.e.*, tenure-track, civil servant, or equivalent) position
Don’t forget to SERVE!

- Volunteer for Review Panels: http://science.nasa.gov/researchers/volunteer-review-panels/
- Please respond as soon as possible.
  - If you can’t travel, let us know that you would be willing to be a virtual panelist.
  - Offer to serve as an external if needed.
- What to do if you have been assigned too many proposals:
  - Contact us and let us know.
  - Consider how many you can reasonably handle and ask us to prioritize.
- Participating in a review, whether in person, virtually, as an external reviewer, or executive secretary is confidential.
- Questions on ROSES16? Contact myself (christina.r.richey@nasa.gov) or Max Bernstein (sara@nasa.gov)!