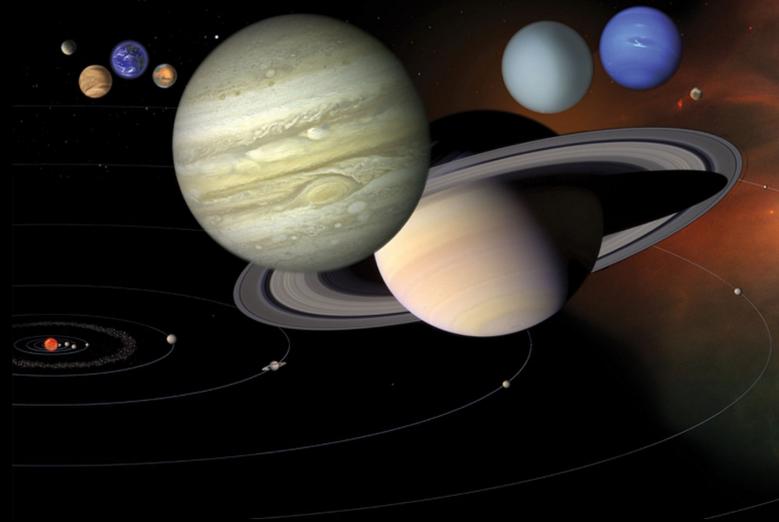


# Workshop on Proposal Writing: Tips and Tricks\*



**Organizer: Christina Richey,  
Jet Propulsion Laboratory**

We appreciate support for this (and other upcoming workshops) from the NASA TWSC Program! Also, thank you to the JPL Foundry for help improving this program!



**Jet Propulsion Laboratory**  
California Institute of Technology

# Agenda

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~~1:00 PM: logistics and welcome~~

**1:10: Proposal Lifecycle**

~~1:25: ROSES, NSPIRES, and SARA~~

~~1:40: **Proposal Writing Guidance** & Activity 1~~

~~2:15: Story #1~~

~~2:30: BREAK~~

**2:40: Peer Review**

~~3:15: Story #2~~

~~3:30: Activity 2: Dissecting a Panel Review~~

~~3:45: Activity 3: Red Team of proposal~~

~~4:10: Story #3~~

**4:25: Selections and Programmatic Balance**

**4:35: Activity #4: Values Exercise**

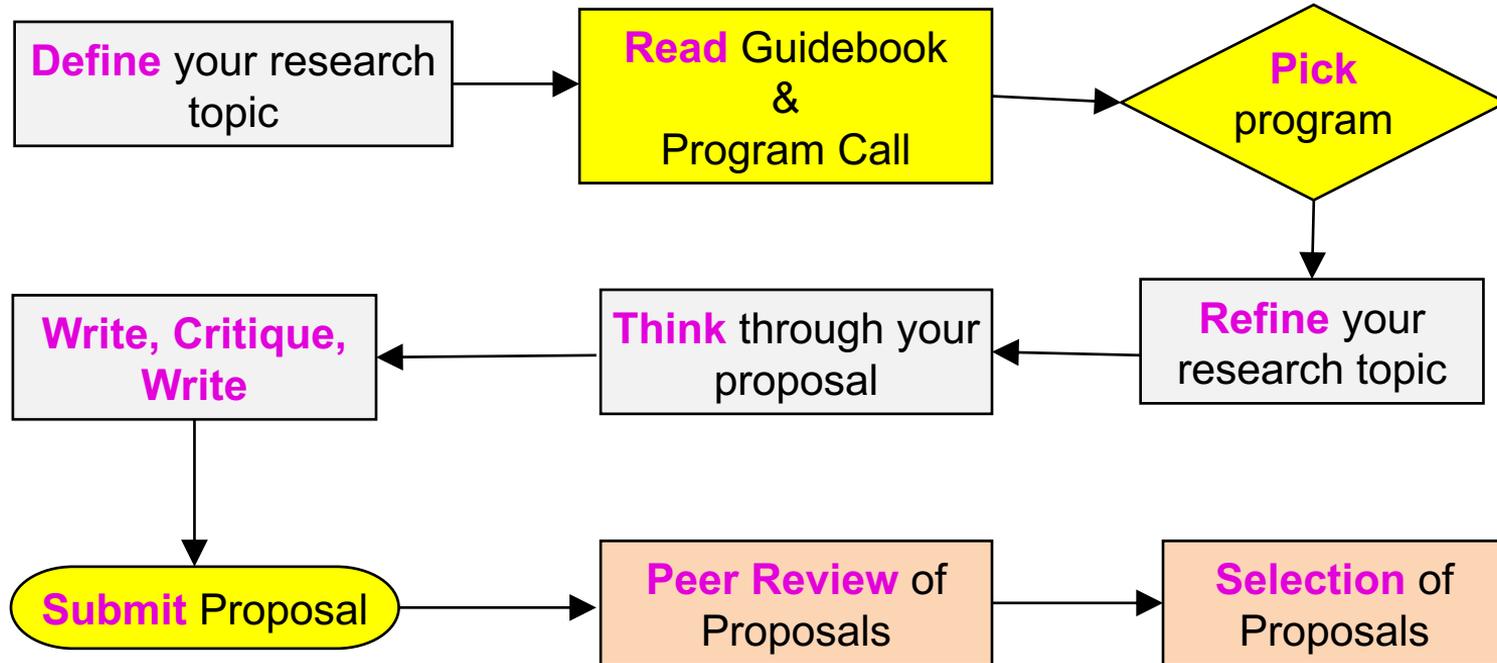
~~4:50: Wrap up & Feedback~~

**Tip #1: Take a FULL Proposal Writing Workshop at a later date!**

**For NASA ROSES ones provided by me (via HQ): AGU, AAS, LPSC Virtual Workshops will start this Fall!**

# The Process...ish

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# What does the NASA Science Pot of Money Look Like?

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- 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-\$15M available each year
- 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)
  - Earth Science, Heliophysics, Astrophysics, and Planetary Science



# Proposal Writing Guidance

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# Managing Expectations

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## 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

# Know Your Vision

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- Have a vision of work you would like to do
  - Target your work/proposal to the appropriate call—**be responsive**
  - Don't find a call and figure out what to propose—just to get funding
- Proposal writing is a long-term process
  - **Your reputation** is made by how well you deliver on every proposal you write and win (or lose)
- Proposal writing involves more than writing
  - **Serve** on committees (be a reviewer!)
  - **Chair** special sessions at meetings
  - **Publish** papers
  - **Work** with program managers
  - **Participate** in and/or convene relevant workshops (and then follow up with a report that can be cited)

# Know Your Work's Place in the Grander Scheme...

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- **Read** the Call for Proposals carefully
- **Understand** the **programmatic relevance** of your idea
  - What NASA missions will the proposed work make cheaper, better, or possible at all?
  - Use National Academy reports, conference reviews, NASA Strategic Plans, Roadmaps for **guidance**
- **Ask** colleagues, supervisor, etc. for help

# Organize Your Work!

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- Organization is key!
- Provide clear signposts throughout the proposal



- Use the SARA website: <https://science.nasa.gov/researchers/sara/faqs/>

# Generic Outline vs Official Compliance Outline

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1. Title
2. Abstract
3. Introduction
4. Problem Statement and Objectives
5. Science Background and Rationale
6. Technical Approach
7. Expected Outcome/Benefits
8. Education and Public Outreach
9. Management Plan
10. Cost Plan
11. Personnel
12. Facilities
13. Appendices

- NASA ROSES Table 1
- Use this as a checklist for ensuring you have all compliant materials needed to submit your ROSES-2018 proposal.
- Need a hard copy? Check the ROSES Summary of Solicitation (SoS) each year
  - <https://nspires.nasaprs.com/external/viewrepositorydocument/cmdocumentid=611943/solicitationId=%7BE2CB9318-72CB-C51A-6962-013E762AE713%7D/viewSolicitationDocument=1/ROSES2018SoSlinksFixed100418.pdf>

# Abstract

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- Will be the first thing read
- **May be the only thing read** (particularly by the final selector)
- Should succinctly frame and distill the proposal
  - State the problem
  - Summarize the solution
  - Summarize the benefits
  - Show how the work relates to the call
  - Give the time frame
  - Mention the team and qualifications
- Write it expansively, then cut it down
- **Remember Step-1 -> Step-2 edits**

# Introduction

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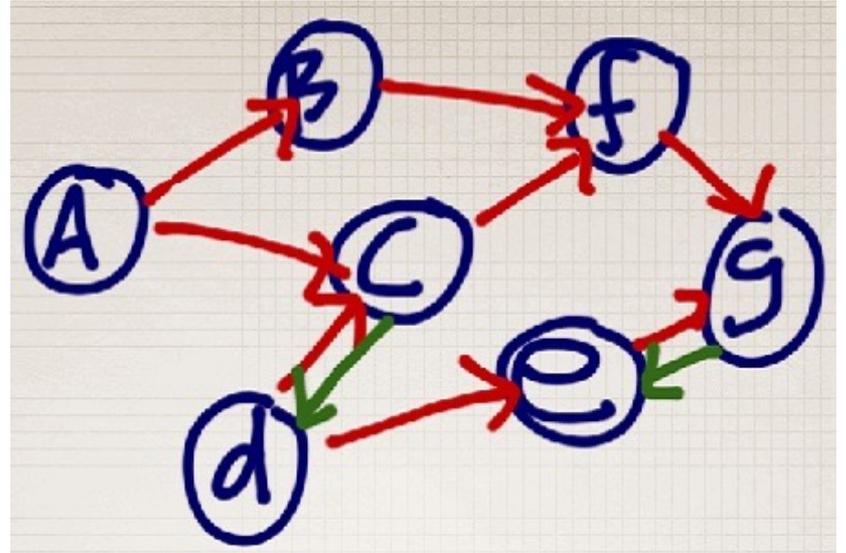
- Shape it as an extended abstract, a guide and roadmap to the rest of the proposal
- **Emphasize clarity, readability, absence of jargon**
- Demonstrate your grasp of the field
  - Offer a short, well-researched overview of relevant science and technology, as well as current practice...**state of the art**
  - Cite key references
- Include 1–2 figures showing state of the art and **how you will advance it**
  - When reviewer is arguing on your behalf, they can jump to a compelling figure

## Problem Statement and Objective

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Clearly define the problem and continuously reference back to it, and **box this in!**

Every proposed action should be **traceable** to the stated objective!



# General Guidance

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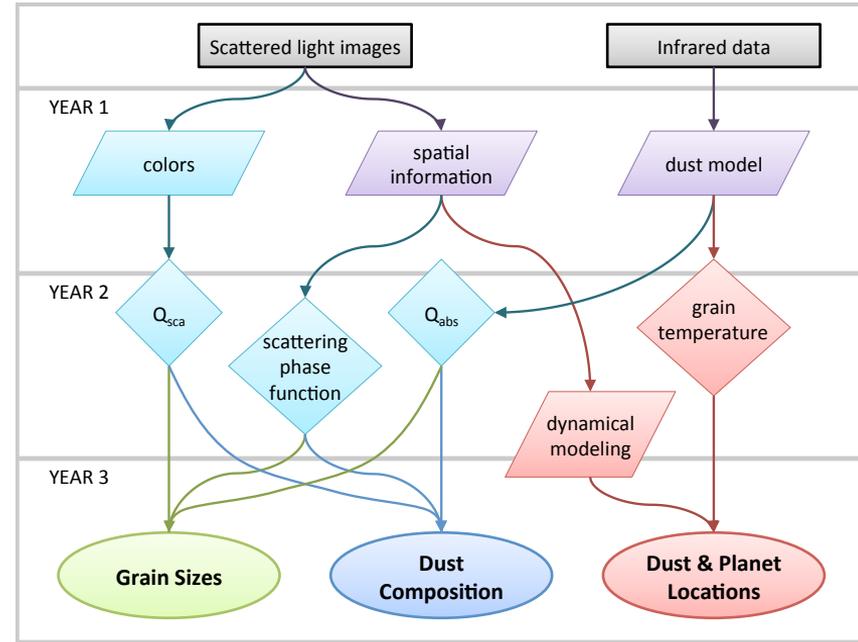
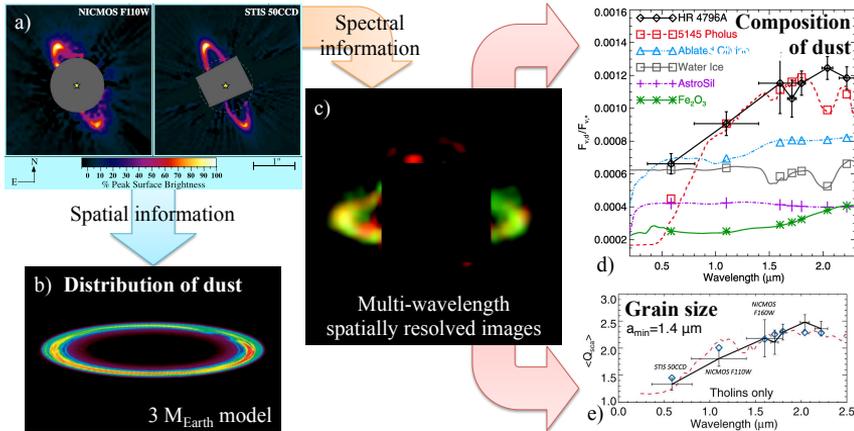
- Thoroughly review and cite the relevant literature
- Avoid full pages of text
- Accentuate the positive
  - Avoid creating the rabbit hole for reviewers to fall down
- Be clear and explicit.
- Highlight your strengths and explain how you intend to mitigate your weaknesses
- Define acronyms and unfamiliar technical terms on first use
- **RUN SPELL-CEHCK**
  - Proof-read to avoid irritating your reviewer



Captions are read before detailed text. Use graphics and figures effectively for impact.

# Visualizing Success

- Use figures, tables, diagrams, and other visual aids to help shape your proposal and guide the reader.



Images courtesy of Hannah Jang-Condell (University of Wyoming)

# Fonts Mater

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- Here's a paragraph of random, useless words. **The words are not the point**, the point is readability. And not just easier **for you to read**, but easiest for your **reviewers to read**. *The more complicated your paragraph, the more you request the reviewer's brain to process the words before they process the content and meaning behind those words*. Do yourself a favor, **and make the content**, and the meaning, easier to get to.
- Here's a paragraph of random, useless words. **The words are not the point, the point is readability**. And not just easier for you to read, but easiest for your reviewers to read. *The more complicated your paragraph, the more you request the reviewer's brain to process the words before they process the content and meaning behind those words*. Do yourself a favor, and make the content, and the meaning, easier to get to.

## Fonts Mater (Continued)

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- Know thy audience: 10% of the world population and 15% of STEM populations have dyslexia. Mono spaced (*Courier*) and Sans Serif fonts (*Verdana*, *Arial*, *Calibri*) are easiest to read, whereas serif Fonts (*Times New Roman*) and fancy fonts (*whatever this is*) are the hardest. Italic serif fonts (like this one in *Time New Roman*) are all but impossible.
- Use Sans Serif fonts whenever possible!
- If you MUST switch to italics, switch to sans serif fonts italics (like *Calibri*).
- Use a different font for you captions of figures and box the figure in.
- Also bold an entire sentence. And if you need to highlight two things in one paragraph, use colors to your advantage (next slide)
- For more info:  
[http://dyslexiahelp.umich.edu/sites/default/files/good\\_fonts\\_for\\_dyslexia\\_study.pdf](http://dyslexiahelp.umich.edu/sites/default/files/good_fonts_for_dyslexia_study.pdf)

# Colors Mater

- Know thy audience: Folks may be colorblind as well, and many of us print documents gray-scaled on black and white printers. Have you made your figures such that they still can be seen in gray scale?

Color order:  Rainbow  Convenient

Color code:  Hex  RGB  CMYK

Accessibility:  95%  99%  99.99%  100%

Maroon #800000	Brown #9A6324	Olive #808000			Teal #469990	Navy #000075			Black #000000
Red #e6194B	Orange #f58231	Yellow #ffe119	Lime #b2df8a	Green #3cb371	Cyan #4db6ac	Blue #377eb8	Purple #984ea3	Magenta #d7191c	Grey #a9a9a9
Pink #f4a582	Apricot #ffd8b1	Beige #f5f5dc		Mint #a1c930			Lavender #c1a1c1		White #ffffff

```
'#e6194b', '#3cb371', '#ffe119', '#4363d8', '#f58231', '#911eb4', '#46f0f0', '#f032e6', '#bcf60c', '#fabeb4', '#008080', '#e6beff', '#9a6324', '#fffac8', '#800000', '#aaffc3', '#808000', '#ffd8b1', '#000075', '#808080', '#ffffff', '#000000'
```

- For more info: <https://sashat.me/2017/01/11/list-of-20-simple-distinct-colors/>

# Overall Proposal Development Advice

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- Read the NRA: Are you responsive?
- Demonstrate excellence; don't claim it
- You need a reviewer to champion your proposal
  - Make it easier for them by providing concise material up front
- Read the NRA again
- Examine the selection criteria and directly address them up front
  - A reviewer should be able to lift sentences from your introduction that could go into their review
- **Go back and really read the NRA**
- Proposals lose because of single sentences or paragraphs
  - <https://www.lohfeldconsulting.com/news-knowledge/100-words-to-avoid-in-proposals/>
  - Get folks to review your work before submitting and use their feedback

# Proposal Writing: Mistakes

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Ways you can avoid making common proposal mistakes\*

-Make sure you have someone edit your work

-Have others review your work, scientifically

-Start as a co-I or student member and learn from others!

-Serve on panels for experience

-NASA ROSES: <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



These are two different people, with different agendas!

# Peer Review

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# The Basics

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## Every Proposal has two Audiences

### 1. Program Officer, Manager, Point of Contact

- Ensures that the work will further the Program's objectives and verifying that funds/time/etc. will be used properly
- Relies on you writing a **COMPLIANT** proposal

### 2. Review Panel

- Ensures that the work is of high scientific quality



**Your job is to make it as easy as possible for these two audiences to select your proposal**

# In General...

- The Program Officer/Coordinator chooses panel members from the greater science community
  - Conflicts of interest are avoided
  - ensures all evaluations are fair & unbiased
- Internal & External Reviewers may/may not be used
- Proposals are given a score/assessment, based on strengths & weaknesses of set criteria
- Large panels may be split into sub-panels
  - Plenary sessions may be used to ensure consistency
  - **Dog Show Rule:** Proposals are not to be compared to each other by review panel



# Peer Review for NASA ROSES

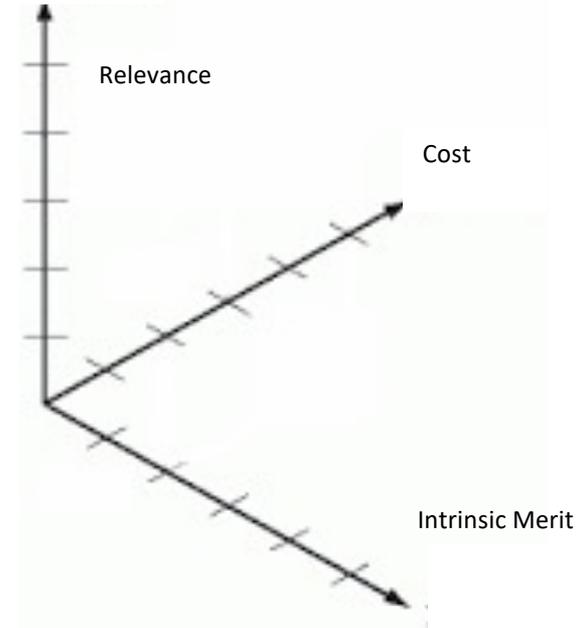
## The Evaluation Criteria

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Criteria are assessed **independently** of one another, and a low rating in any one is cause for non-selection:

- 1. Intrinsic Merit:** Science and Technical Merit
- 2. Relevance to the Program**
- 3. Costs:** Does NOT mean Total \$\$\$

- **Criteria detailed in Guidebook for Proposers.**
- **Additional criteria may be outlined in the specific call!**
- **Look for language “will be judged/reviewed upon”.**



Guidebook for Proposers:

<https://www.hq.nasa.gov/office/procurement/nraguidebook/proposer2018.pdf>

# The Score

Summary Evaluation	Basis for Summary Evaluation	Relationship of Summary Evaluation to Potential for Selection
<u>Excellent</u>	A thorough, and compelling proposal of exceptional merit that fully responds to the objectives of the FA as documented by numerous or significant strengths and with no major weaknesses.	Top priority for selection in the absence of any issues of funding availability, suspension or debarment, past performance or programmatic priorities.
<u>Very Good</u>	A competent proposal of high merit that fully responds to the objectives of the FA, whose strengths fully out-balance any weaknesses and none of those weaknesses constitute fatal flaws.	Second priority for selection in the absence of any issues of funding availability, suspension or debarment, past performance or programmatic priorities.
<u>Good</u>	A competent proposal that represents a credible response to the FA, whose strengths and weaknesses essentially balance each other.	May be selected as funds permit based on programmatic priorities.
<u>Fair</u>	A proposal that provides a nominal response to the FA but whose weaknesses outweigh any strengths.	Not selectable regardless of the availability of funds or programmatic priorities.
<u>Poor</u>	A seriously flawed proposal having one or more major weaknesses that constitute fatal flaws.	Not selectable regardless of the availability of funds or programmatic priorities.

- Criteria are assessed and the review panel will assign a score to the proposal based off definition from the NRA Guidebook for Proposers.
- **Scores may be assign for IM, Relevance, Cost, and/or Overall.**

## Other Issues: Reviewing

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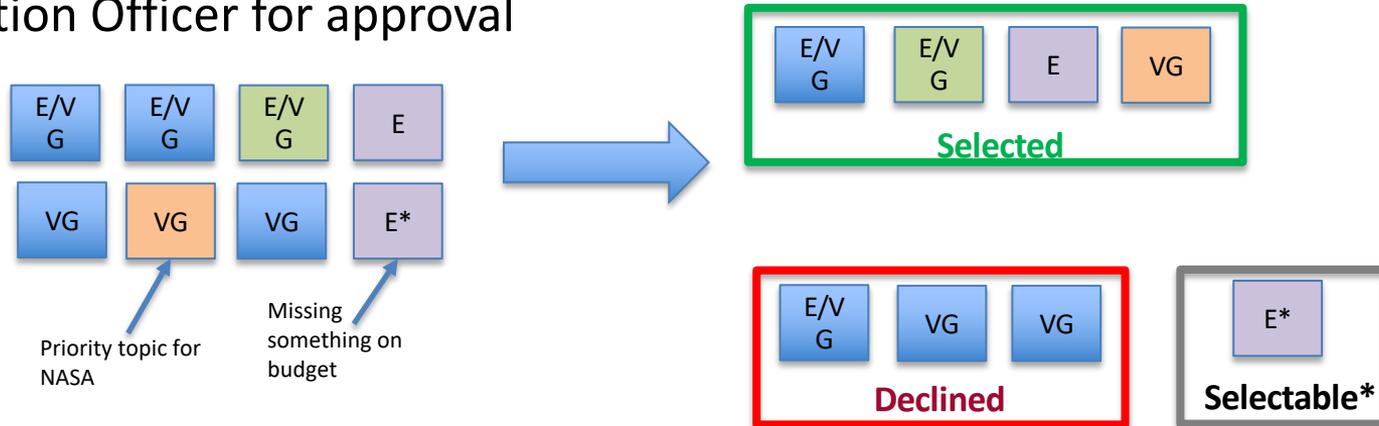
- **Crying Baby on an Airplane Rule**
  - Assume your reviewer is highly distracted when reading your document
- **Things that upset reviewers**
  - Typos
  - Full pages of dense text
  - Lack of clarity and specificity
  - Lack of organization
  - Lack of relevance to the call
  - Your abstract/summary is old and not on the actual topic of the proposal

# Selections & Programmatic Balance

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# After the Peer Review

- Program Officer integrates findings of panel with programmatic and budgetary considerations
  - Programmatic balance is an important factor
  - Budgets and time commitments are reviewed
- Program Officer formulates list of recommended selections and submits to Selection Officer for approval





## Suggestions: When you are Selected



- 
- Serve on a review panel
  - Stay in touch with the Program Officer regarding funding receipt
    - Plan far ahead if you have a critical deadline for receipt of funds
  - Submit your Progress Report on time
  - Invite the Program Officer to your talk/poster
  - Send Program Officer copies of papers that came from funding!



## Suggestions: When You are not Selected



- If you simply must fire off an email to the Program Officer 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 Program Officer to answer any questions
  - Contest the review if you feel that major mistakes were made
- Always use the comments from the Review Panel and debrief to improve your proposal before proposing again
- Agree/Volunteer to serve on Review Panels
- Check for other funding opportunities.

# Combatting Negativity

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## Combatting Negative Thoughts Within Yourself:

- Talk about the issue with someone you trust
- Ask your friends what they think of you
- Use your own words to influence how you think
- Build alliances
- Own your accomplishments
- Re-orient yourself around your VALUES

## Combatting Negative Thoughts Within Others:

- Encourage people
- Discourage hostility and bickering
- As a leader, show your own uncertainties & demonstrate your own learning process
- Reward and encourage people in your group for mentoring others
- Don't make it personal when someone's work needs improvement.



## 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
- It is never too early to start gaining proposal experience
- Networking really is a critical part of career: get your name out there in positive ways!
- Remember your VALUES!

THANK YOU  
THANK YOU

**THANK YOU:** Paul Propster (and everyone at The Foundry), Rob Hannah, and the fine folks at NASA who support this workshop through the TWSC Program! Also, thank you to each of you for taking this workshop today!

