Proposal Writing- Tips and Tricks for Success!
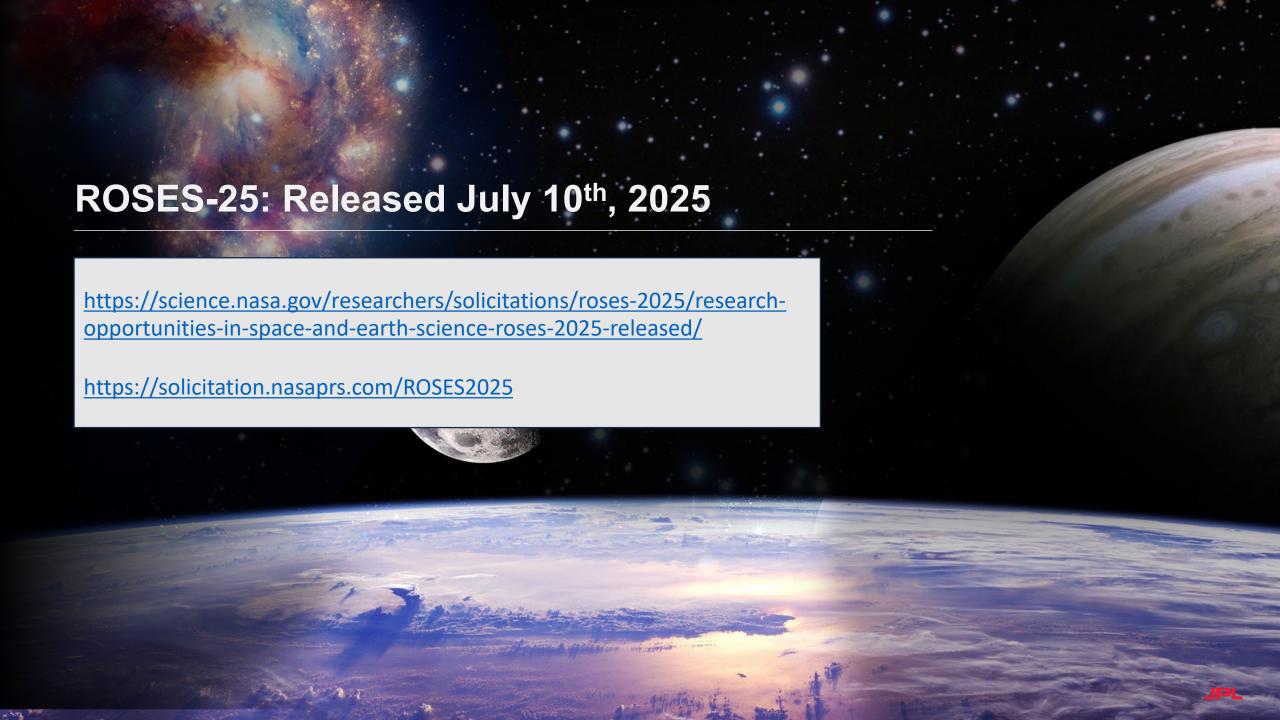
Christina Richey
Jet Propulsion Laboratory
California Institute of Technology

ROSES-25: Released July 10th, 2025

https://science.nasa.gov/researchers/solicitations/roses-2025/research-opportunities-in-space-and-earth-science-roses-2025-released/

https://solicitation.nasaprs.com/ROSES2025

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Tips and Tricks

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Managing Expectations

What will <u>not</u> 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 <u>will</u> 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

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General Guidance

Organization is key!

Follow the Guidebook for Proposers tables and instructions

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

Provide clear signposts throughout the proposal

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Problem Statement and Objective

Clearly define the problem and continuously reference back to it, and **box this in!**
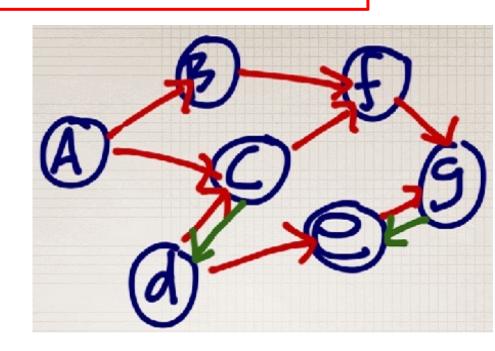
Goal
The broad interest/theme that your proposal will focus on

Objective
The actual question you can answer with the data at hand, which will bring you closer to the goal

Task
The work required to get the data in hand to answer your key objective(s)

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

Acquiring more data is never an objective, nor is it a goal.

General Guidance

Thoroughly review and cite the relevant literature

Avoid full pages of text (>1/2 the pages)

Accentuate the positive
- Avoid creating the rabbit hole for reviewers to go down

Be clear and explicit

Highlight your strengths and explain how you intend to mitigate your weaknesses

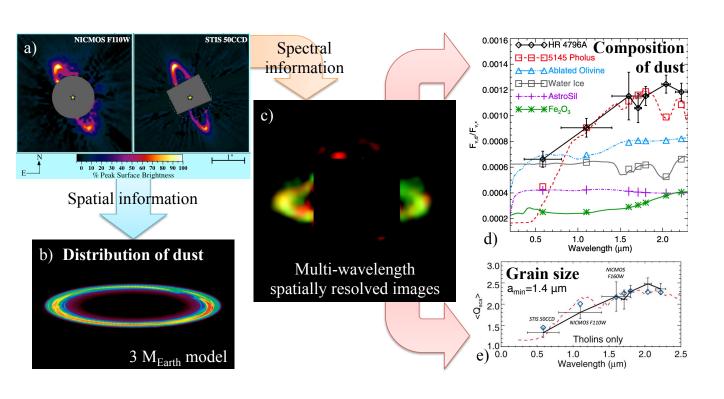Define acronyms and unfamiliar technical terms on first use

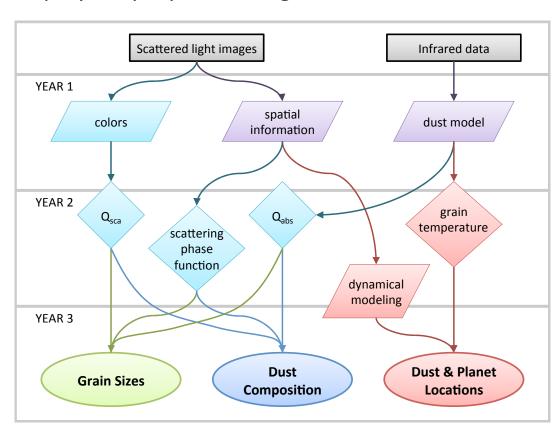**RUN SPELL-CEHCK**
- Proof-read to avoid irritating your reviewer

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

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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 (NASA HQ)

Fonts Matter

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.

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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 your captions of figures and box the figure and the caption in.

Also bold an entire sentence

And if you need to highlight two things in one paragraph, use colors to your advantage (next slide)
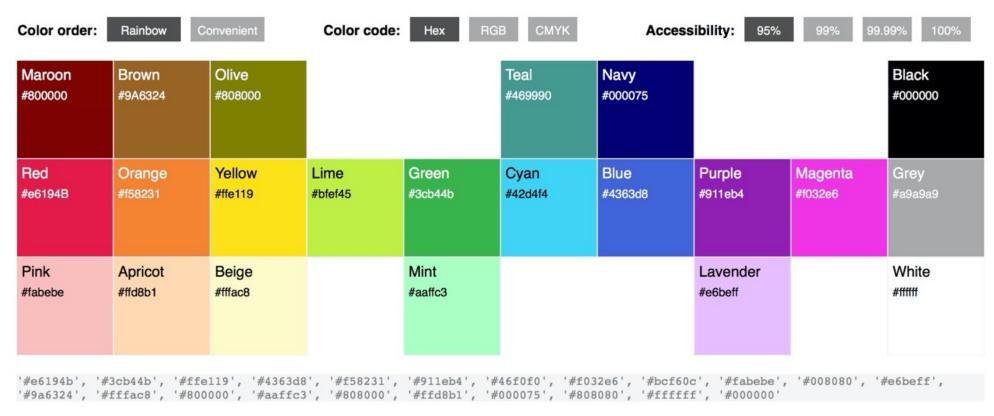
For more info: http://dyslexiahelp.umich.edu/sites/default/files/good_fonts_for_dyslexia_study.pdf

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Colors Matter

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?

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

Overall Proposal Development Advice

- Read the Call: Are you responsive?

- *Read the CALL again*

- Demonstrate excellence; don't claim it

- ***Go back and really READ the CALL!!***

- You need a reviewer to champion your proposal
  - Make it easier for them by providing concise material up front

- 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

- Proposals lose because of single sentences or paragraphs
  - What did you say or forget to say that could hurt you?

https://www.lohfeldconsulting.com/news-knowledge/100-words-to-avoid-in-proposals/

Proposal Writing: Mistakes
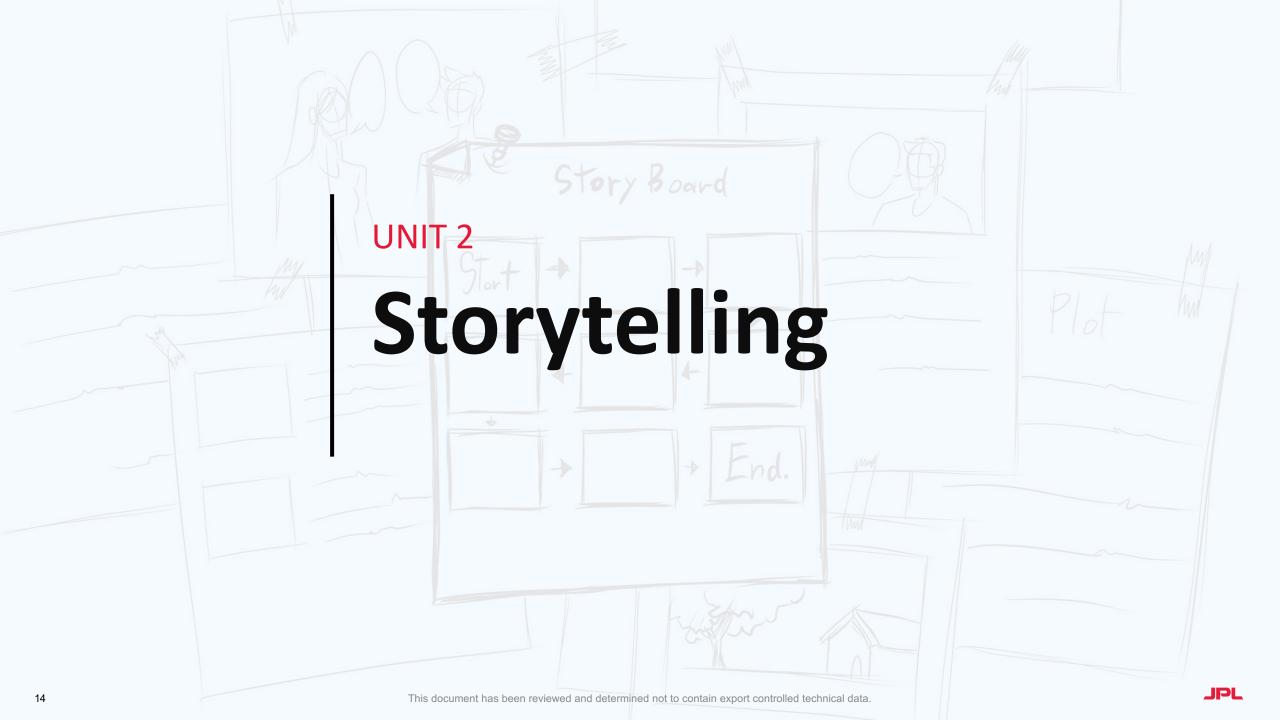
Ways you can avoid making common proposal mistakes
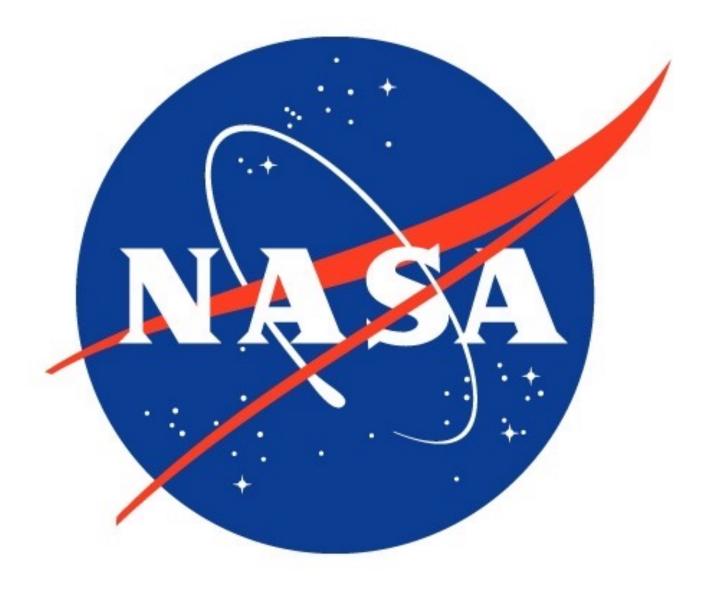
- Make sure you have someone edit your work ←
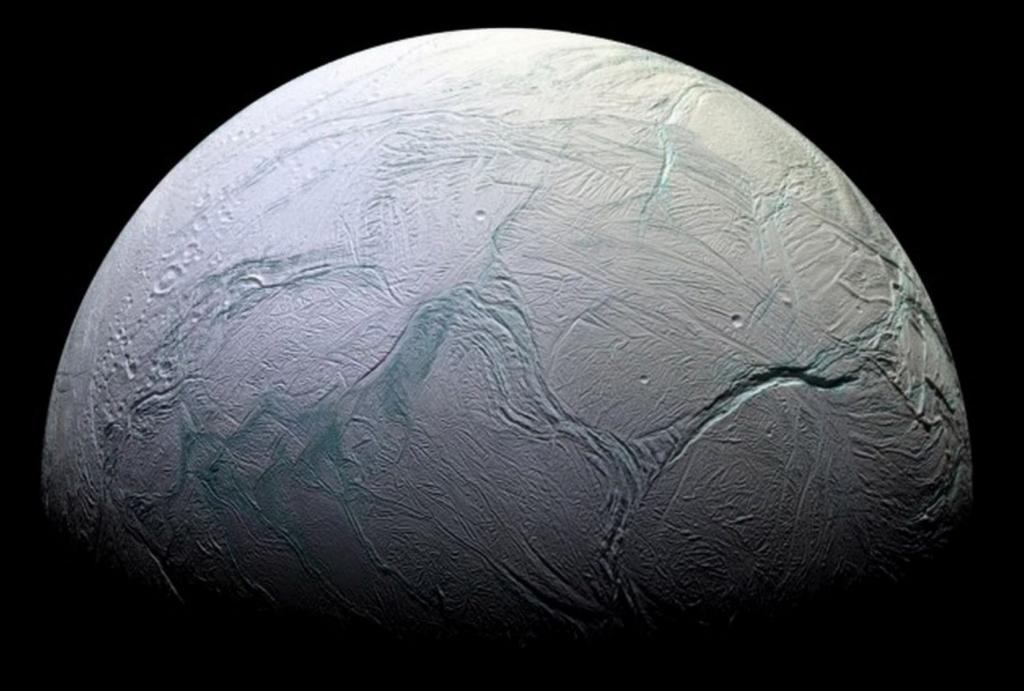- Have others review your work, scientifically ←
- Start as a co-I or student member and learn from others!
- Serve on panels for experience
  - NASA ROSES: http://science.nasa.gov/researchers/volunteer-review-panels/
    - Please respond as soon as possible
    - If you can't travel, let us know that 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!

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UNIT 2

Storytelling

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Universe of "What Ifs"

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Competition of Ideas

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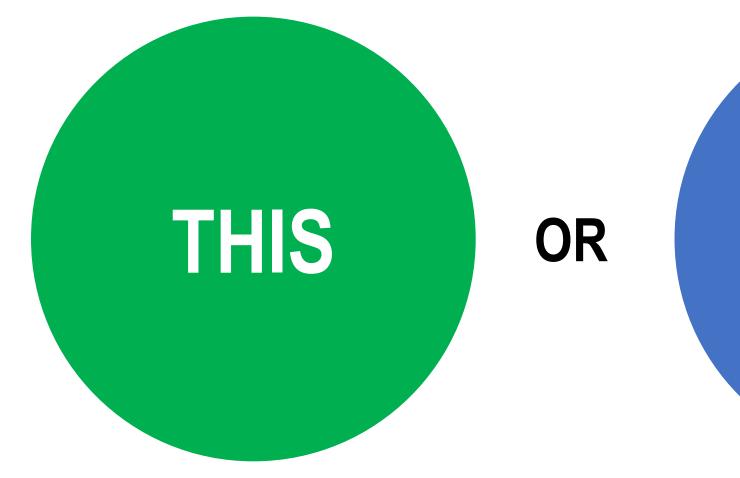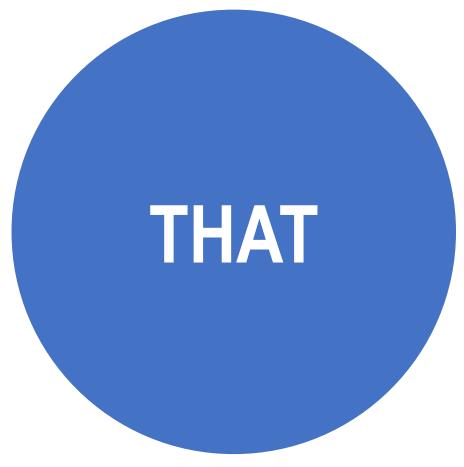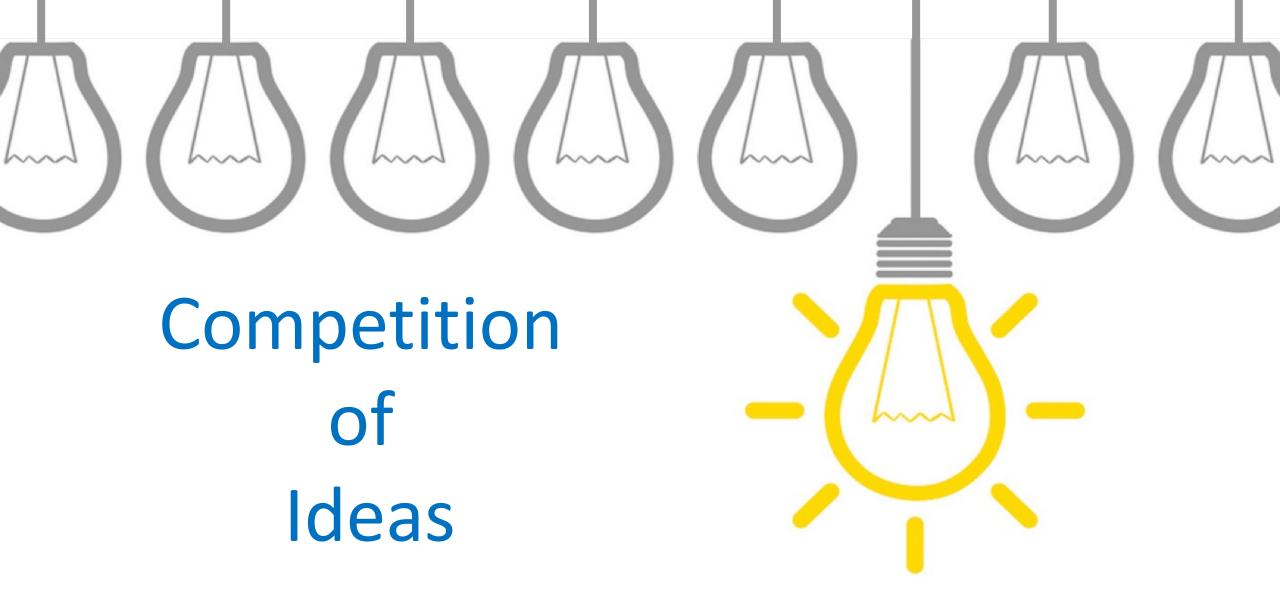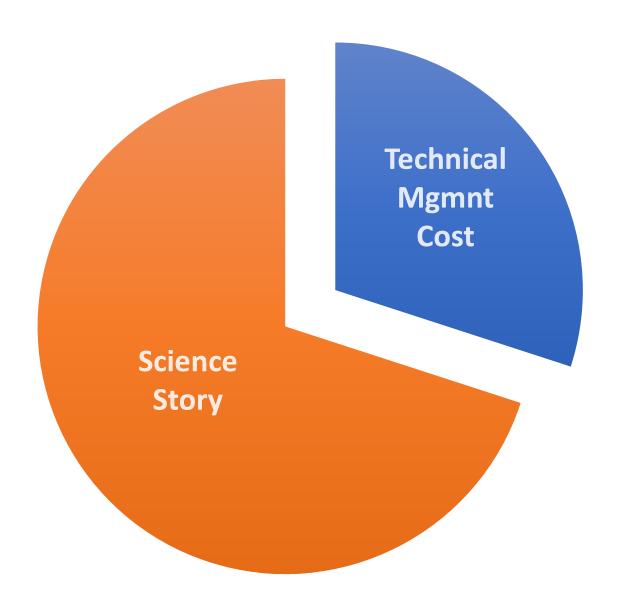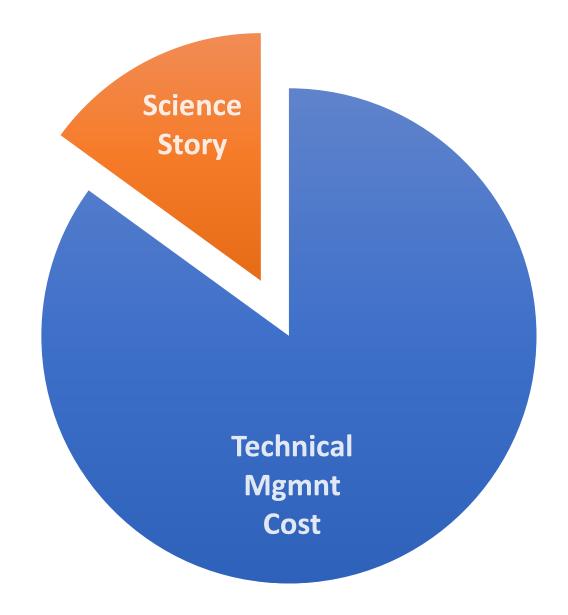
What NASA *values*

What teams traditionally *value*

This document has been reviewed and determined not to contain export controlled technical data.

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ei
emotional investment

ca
critical assessment

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ei
emotional investment

ca
critical assessment

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TRIDENT
MISSION TO AN EXOTIC ACTIVE WORLD

Dr. Jeffrey Isaacson
Authorizing Official
President and Chief Executive Officer
Universities Space Research Association

Dr. Louise Prockter
Principal Investigator
Universities Space Research Association/
Lunar and Planetary Institute

Prepared for NASA Science Mission Directorate in response to Discovery 2019 AO NNH19ZDA010O July 1, 2019

Humans Hard-Wired for Story?

It's not,

"Did I *say* what I wanted to say?"

It's,

"Did they *hear* what I need for them to hear?"

Human brains are ***physically hardwired*** to ***make sense*** of incoming information and experience ***in specific story terms or elements***.

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Complexity

The **more complicated** your information, the **simpler your language** should be.

Don't dump a load of **facts**. Deliver the **most essential information** in a way that interests them and **makes them want to know more**.

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Complexity: Story Spine and Flow

Move from **simple** to complex, from **familiar** to unfamiliar.

Start with basics, and then "gently" introduce complexity.

The person communicating their idea is responsible for how well the other person follows them.

Complexity

I am studying Didymosphenia geminata, an invasive species known to impair the recreational and ecological values of waterways and native species.

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Complexity

I study *rock snot.*

This is a kind of alga that forms brown, oozing masses that resemble a sewage spill.

They grow so large that they can block streams and kill fish.

Rock snot is an invasive species, meaning it comes from outside the region and harms the local balance of nature.

Its scientific name is Didymosphenia geminata.

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The brain relies on two sources of information

- ***The source material***
  (your story)

- ***Banks of Prior Knowledge***

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*A deep structure of **storytelling***:

1. Once upon a time there was …
2. Every day …
3. One day …
4. Because of that …
5. Because of that …
6. Until finally …

From the boardroom to the playground

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Disney · PIXAR
FINDING NEMO

Pixar story artist, Emma Coats

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1. **Once upon a time there was** … a widowed fish, named Marlin, who was extremely protective of his only son, Nemo.

2. **Every day** … Marlin warned Nemo of the ocean's dangers and implored him not to swim far away.

3. **One day** … in an act of defiance, Nemo ignores his father's warnings and swims into the open water.

4. **Because of that** … he is captured by a diver and ends up in the fish tank of a dentist in Sydney.

5. **Because of that** … Marlin sets off on a journey to recover Nemo, enlisting the help of other sea creatures along the way.

6. **Until finally** … Marlin and Nemo find each other, reunite and learn that love depends on trust.

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From scientist to stakeholder

1. Once upon a time there was …
2. Every day …

3. One day …

4. Because of that …
5. Because of that …

6. Until finally …

Current state-of-the art

Light Bulb

Advance the SoA

"New" knowledge

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From scientist to stakeholder

1. Once upon a time there was …
2. Every day …

3. One day …

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Current state-of-the art

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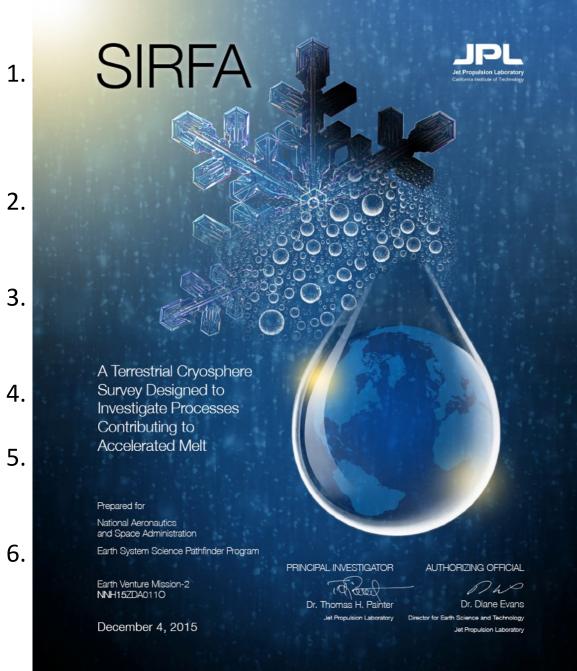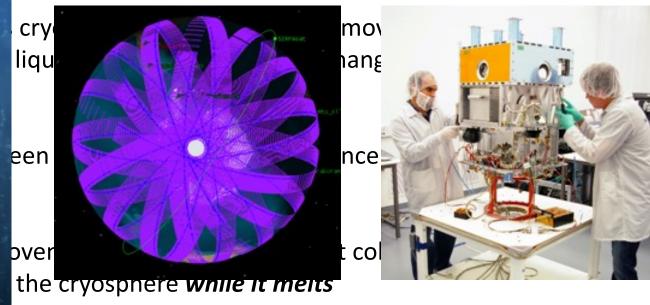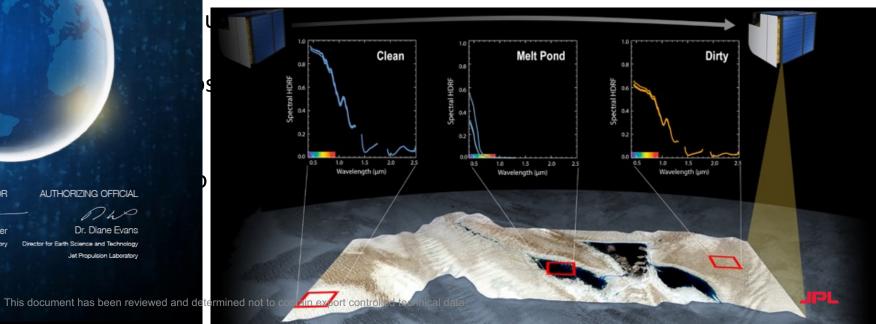
Unit 3

Building Resilience

A smooth sea never made a skilled sailor.

Franklin D. Roosevelt

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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

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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

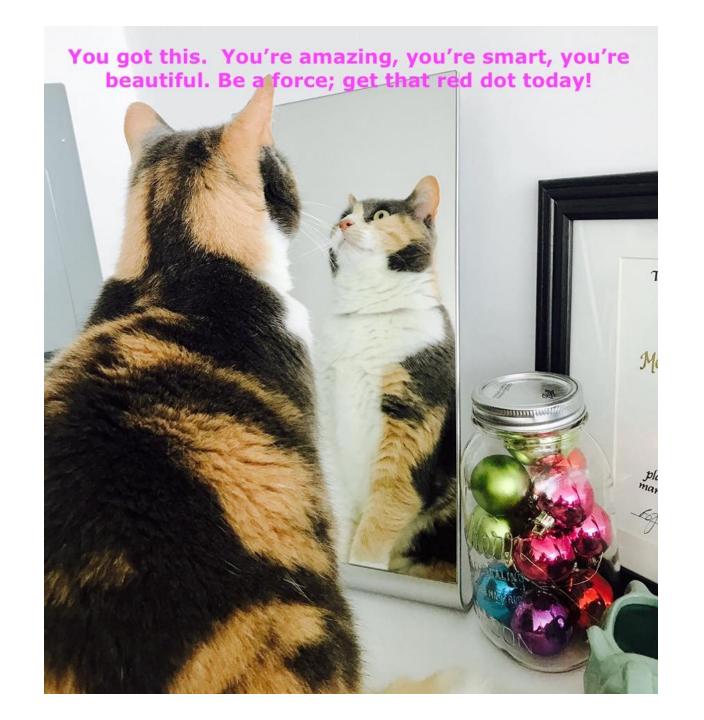- Don't make it personal when someone's work needs improvement.

Activity: Values Exercise

You got this. You're amazing, you're smart, you're beautiful. Be a force; get that red dot today!

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When you think of the times in your life when you've been the happiest, the proudest, or the most satisfied, which of the following come to mind?

- Accomplishment
- Accountability
- Achievement
- Action
- Activism
- Adventure
- Affection
- Ambition
- Autonomy
- Challenge
- Close relationships
- Commitment
- Community
- Compassion
- Competence
- Competition
- Confidence
- Conformity
- Control
- Coolness under fire
- Cooperation
- Courage
- Creativity
- Credibility
- Decisiveness
- Desires
- Economic security

- Fame
- Family
- Foresight
- Free time
- Freedom
- Friendships
- Growth
- Happiness
- Health
- Helping other people
- Helping society
- Honesty
- Hospitality
- Independence
- Influence
- Inner harmony
- Insight
- Inspiration
- Integrity
- Intellectual status
- Introspection
- Justice
- Knowledge
- Leadership
- Location
- Love
- Loyalty

- Order
- Patriotism
- Peace
- Persistence
- Personal development
- Physical challenge
- Pleasure
- Power and authority
- Privacy
- Public service
- Purity
- Quality
- Recognition
- Reputation
- Responsibility
- Romance
- Security
- Self-knowledge
- Self-reliance
- Self-respect
- Serenity
- Sophistication
- Spirituality
- Stability
- Status
- Tenacity
- Tranquility

- Effectiveness
- Efficiency
- Enthusiasm
- Environmentalism
- Excellence
- Excitement
- Fairness
- Faith
- Meaningful work
- Mentorship
- Merit
- Money
- Movement
- Music
- Nature
- Openness
- Truth
- Vibrancy
- Volunteering
- Wealth
- Will-power
- Wisdom

[add any that are missing]

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In general, do you try to live up to the values you came up with?

Why are these values important to you? Reflect.

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When you think of your career as a scientist, researcher, or educator, which values come to mind?

- Accomplishment
- Accountability
- Achievement
- Action
- Activism
- Adventure
- Affection
- Ambition
- Autonomy
- Challenge
- Close relationships
- Commitment
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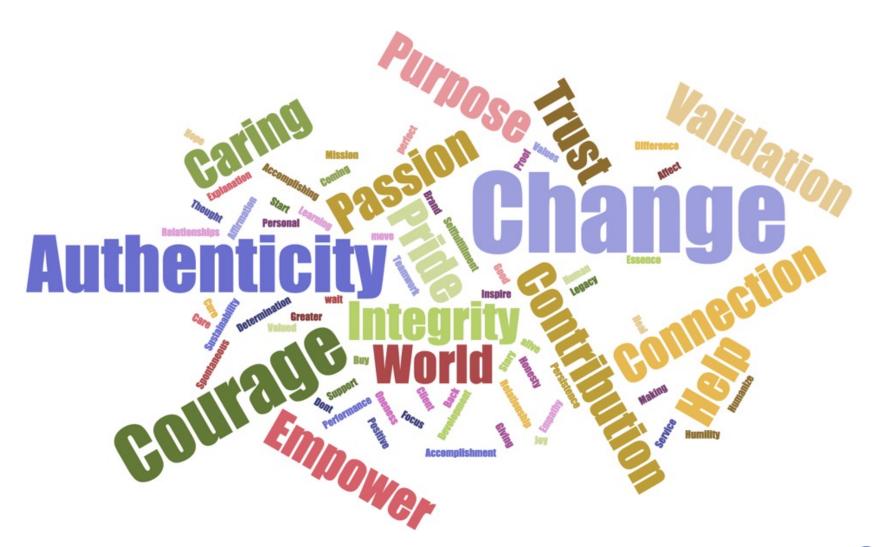- **[add any that are missing]**

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How to Improve your Resilience

	Social Support	Physical Self-Care	Meaning & Purpose in Life	Self-Efficacy
BEFORE				
DURING				
AFTER				

1. **Social Support** improves the brain's ability to cope with trauma and recover for its impact.
2. **Self-Efficacy,** or feeling confident and competent, allows the brain to process information more accurately.
3. Understanding personal motivations within a larger context of **Meaning & Purpose** anchors the brain during a traumatic experience
4. **Good Health & Fitness** increases the brain's ability to maintain normal size and function despite distressing experiences.

For more on resilience:
www.headington-institute.org

Activity: Values Exercise

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 CALL for the program

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

Understand you have to think differently to effectively communicate your science

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

Take care of yourself and others around negativity and values.