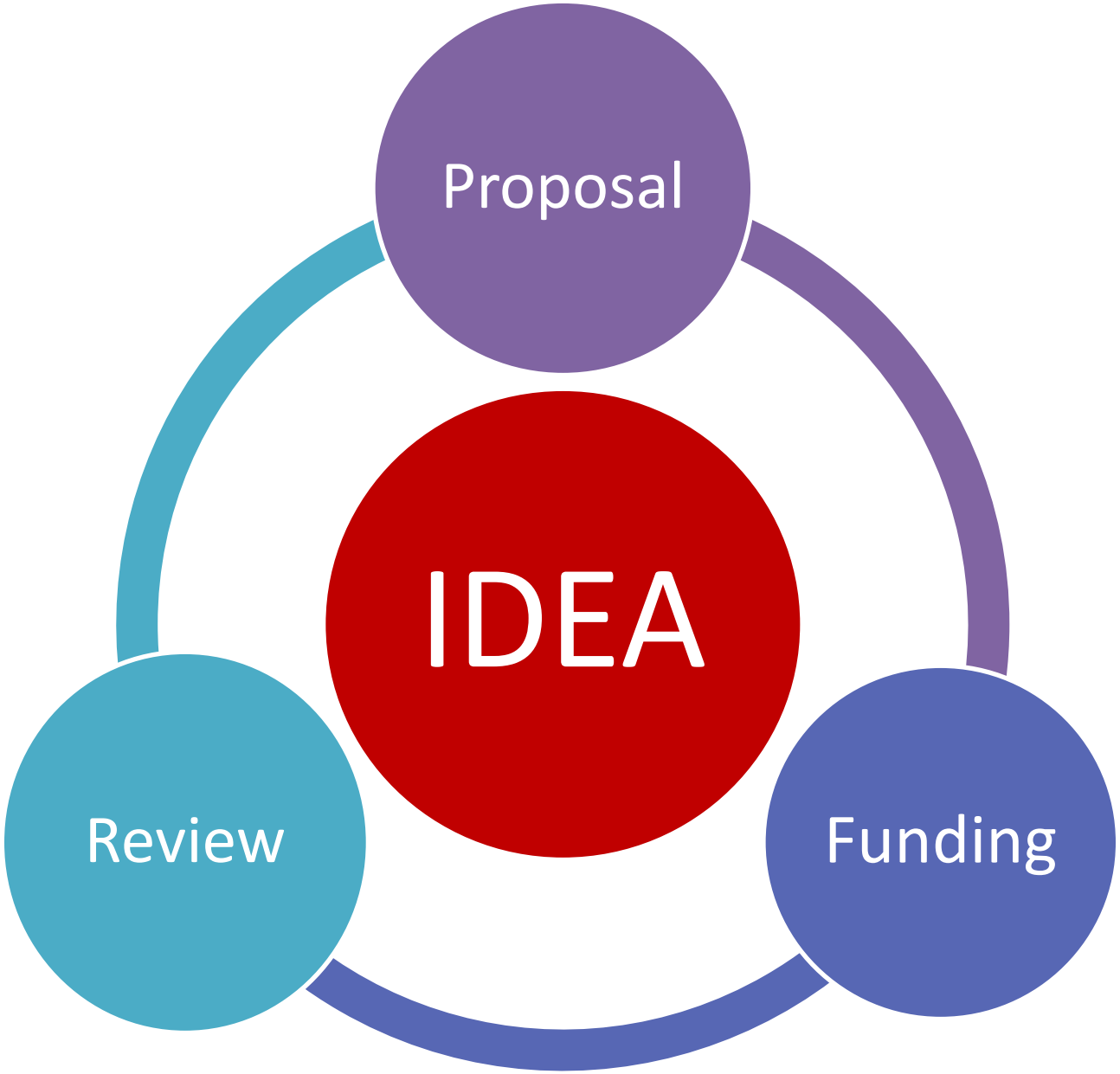
Early Career Workshop

Proposal Writing

Review

Funding


Proposal
IDEA
Review
Funding

Fundamental Principles of Successful Written Communication

- Write something for other people to read when you genuinely believe that you have something interesting to say
- Identify clear science questions
- Write with your readers' interests, capabilities, and expectations in mind.
- Don't assume readers know the details of your science problem or its history
- Don't wait until the last minute to submit – coordinate closely with your authorizing officials early on!

How to structure your Proposal

- Pay attention to the title and project summary:

  This is your opportunity to make a good first impression and capture the reviewers' attention

  Don't allow your title to be your abstract – after you write your proposal make sure your title still fits
- Lay out the main idea and expected outcome early on. Be clear about how your study fits in to the big picture of oceanography, climate, Earth Science, etc.
- Set up the problem with a strong background section to motivate the problem, but don't overdo it.
- Build your case from the references, but don't try to quote everybody.
- Make sure your figures and tables are legible and labeled

How to structure your Proposal

- Describe your approach by linking the methods to your stated goals, hypotheses and science questions.
- The challenge is to find the right balance in the level of details.
- Address additional review criteria (broader impacts, relevance to agency mission, special solicitation requirements)
  - *Read the solicitation and any guidebook for proposers carefully – if something is labeled "required" pay very close attention*
- End with a recap of your motivation for the project and expected outcomes.

Should I go it alone or seek collaborators ?

- Concern: I am new and don't have a track record, should I look for a mentor?
- Benefits: additional/complementary expertise and different approach to problem
  - *Your publications establish your track record or trajectory*
- Pick your collaborator(s) carefully: world expert vs. someone you enjoy working with?
  - *What do partners bring to the project?*
- Make sure that you are on the same page (it can be obvious when a proposal has been written by multiple authors)
- Example: if you are planning to create an Ap, have someone that has that demonstrated expertise; If you are going to work with an elementary school, someone should be involved in the proposal

Corollary #1 for Writing a Research Proposal

- You must make a strong case for your research project in the first two or three pages of your proposal

- If you have not done so, throw out what you have written and start again

Corollary #2 for Writing a Research Proposal

- For every research objective, there must be a defensible plan for collecting the appropriate “data”, as well as a clear and logical path that will lead from the “data” to the attainment of the objective.

The Review Process

- Peer Review vs. Merit Review
  - Most funding agencies conduct peer review using ad-hoc written reviews and/or review panels
  - The scientists reviewing your proposal are your main audience: understand who they are
  - Most funding agencies use additional criteria: relevance to mission, portfolio balance, demographics…

Realities for Successful Scientific Writing in a Peer Review System

- Most science reviewers take their review responsibilities very seriously; a few do not
- Science reviewers are always very busy
- Most science reviewers are also writers
- Scientists like to know ahead of time what you are going to tell them. No surprises—please!
- Science reviewers look for logical progression of thought and have little patience with random walks
- Science reviewers realize that research costs $ and that $ are in short supply

Funding Agencies

- Continuum of funding sources with some overlap from “send us your best idea” to “help us improve our services”.
- Within a particular funding agencies multiple funding mechanisms exist: do your homework!
- Most agencies have a web site listing recent and current awards: make use if it!
- Talk to program managers once you have a mature idea and have identified a program(s) where you might submit your proposal.

My proposal was declined: what are my next steps?

- The initial reaction is usually emotional: Disappointment, frustration and even anger
- It is tempting to look for flaws in the reviews instead of objectively analyzing the feedback. This may take some time.
- Start with the high level feedback/advice.
- Focus on the comments not the ratings.
- Not every reviewer is “nice” - don’t take it personally – keep in mind constructive criticism when you review

The National Science Foundation's Approach

Fundamental principle is to evaluate proposals submitted to open, competitive research announcements using merit review.

Two review criteria:

- *Intellectual Merit:* The Intellectual Merit criterion encompasses the potential to advance knowledge*;*
- *Broader Impacts:* The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

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Geo

Important Elements for both Review Criteria

1. What is the potential for the proposed activity to:
   a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
   b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Proposal Preparation

Resources

- Grants.gov Guide (how to submit proposals to the NSF)*
- Grant Proposal Guide (GPG)-required format for NSF proposals*
- Guide to Programs*
- How to prepare a proposal*
- Program Announcements* – eligibility, goals, special requirements
- Program Officers – current or former rotators
- NSF Custom News Service – what's new

*found on the NSF Home Page under "FUNDING" tab

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NSF Funding Information

Resources:

Program Officers – current or former rotators (under about NSF)

Current NSF Awards

NSF Custom News Service

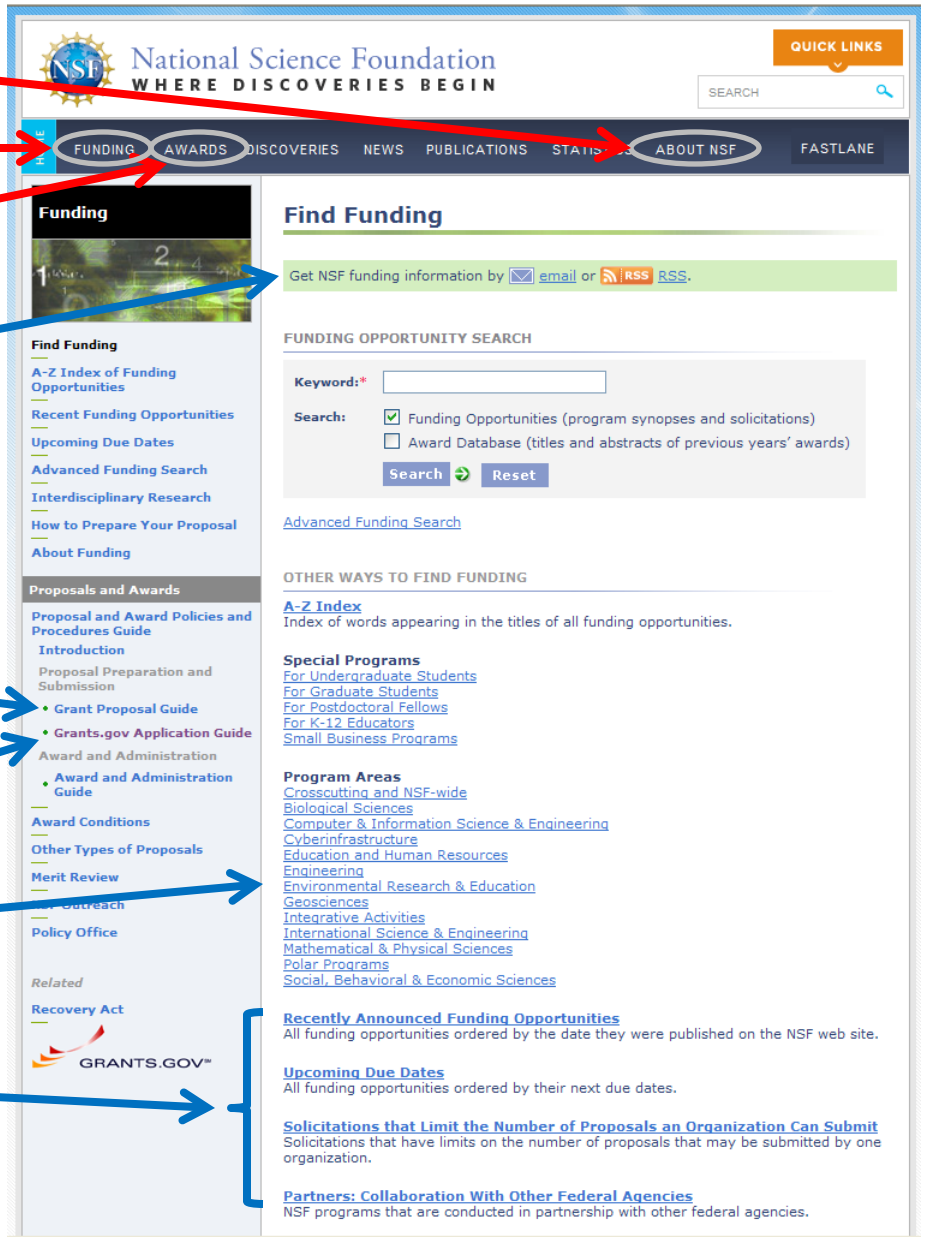
Guide for proposal writing
http://www.nsf.gov/pubs/2004/nsf04016/nsf04016.pdf

Grant Proposal Guide (GPG)-required format for NSF proposals

Grants.gov Guide (how to submit proposals to the NSF)

Guide to Programs

Program Announcements – eligibility, goals, special requirements



Words of Wisdom

- Talk to your Program Directors

  Ask us early, ask us often!!
- Learn the culture – each Division and Directorate has a different *modus operandi*
- Volunteer to be a reviewer
- Don’t forget to address “Broader Impacts”

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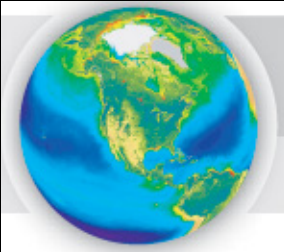
Faculty Early-Career Development (CAREER) Program

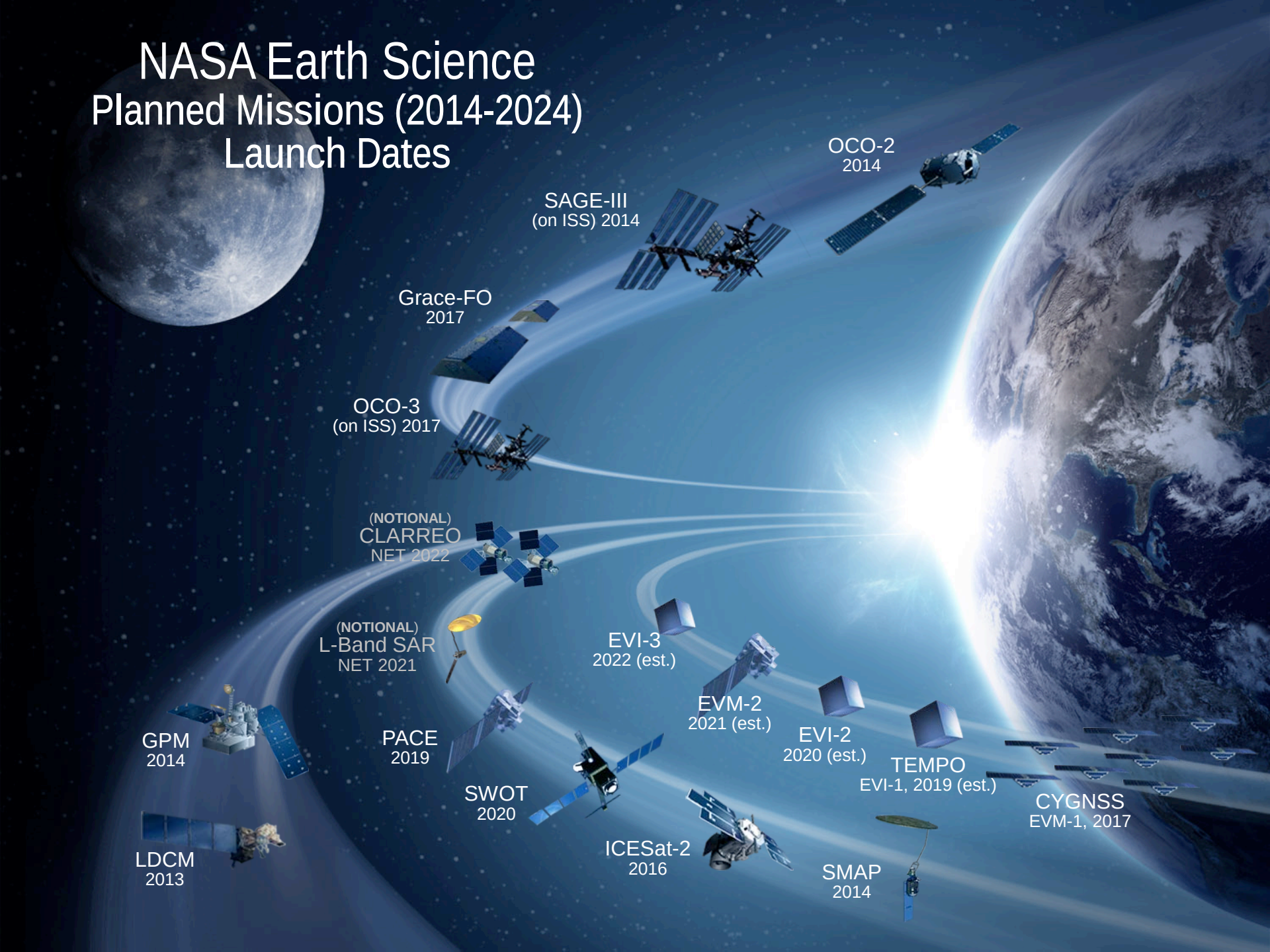
- Most prestigious awards to help a junior faculty member develop activities that can effectively integrate research and education within the context of his/her organization.
- CAREER awardees are eligible to be nominated for the Presidential Early Career Award for Scientists and Engineers (PECASE).
- Program Solicitation: NSF 14-532
- A PI can submit a proposal to the CAREER program three times. Your success in writing a successful CAREER proposal may be increased with prior experience in proposal writing.
- See CAREER web page for more details:

  http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503214



What does NASA do in its Science Mission Directorate?

- Space Science
  - Astrophysics
  - Planetary Science
  - Heliophysics
  - Earth Science
- Human Exploration
  - International Space Station


NASA Earth Science
Planned Missions (2014-2024)
Launch Dates
OCO-2
2014
SAGE-III
(on ISS) 2014
Grace-FO
2017
OCO-3
(on ISS) 2017
(NOTIONAL)
CLARREO
NET 2022
(NOTIONAL)
L-Band SAR
NET 2021
EVI-3
2022 (est.)
EVM-2
2021 (est.)
EVI-2
2020 (est.)
TEMPO
EVI-1, 2019 (est.)
CYGNSS
EVM-1, 2017
GPM
2014
PACE
2019
SWOT
2020
ICESat-2
2016
SMAP
2014
LDCM
2013

NASA Earth Science Division

Earth Science has a charter:

to understand and protect our home planet

Sections within the Earth Science Division

Research and Analysis

Applied Sciences

Earth Science Technology Office

Data Systems

Education and Outreach

R&A - **16 Disciplinary Programs**

Responsive to Presidential Mandates (e.g., the US Global Change Research Program) and Executive Orders (e.g., National Ocean Council), NASA strategic plans

NASA– Research Opportunities in Space and Earth Sciences (ROSES)

- http://nspires.nasaprs.com/ - Omnibus solicitation released mid-February each year
  - Through this page you can get on the NSPIRES and ROSES Email list
  - Table of Contents – can search program elements/topic areas of solicitation as well as due dates
  - Guidebook for Proposers for helpful hints and FAQs
  - Ocean Biology and Biogeochemistry – Field Campaign Planning – Scoping Studies
    - EXPORTS – EXport Processes in the Ocean from RemoTe Sensing (D. Siegel, UCSB and K. Buessler, WHOI) – Town Hall Thursday PM
  - NASA Data for Operation and Assessment
  - The Science of Terra and Aqua
  - Carbon Cycle Science
  - Interdisciplinary Science
  - Mission Science Teams and rationales and studies to support new missions (PACE)
  - *In situ* sensors, airborne sensors, satellite sensors
  - Earth and Space Science Fellowships - graduate student support, non-US citizens welcome

  - New (Early Career) Investigator Program in Earth Science

http://nspires.nasaprs.com/external/solicitations/summary.do?method=init&solId={E757BD20-0401-C62D-3683-3E5199978FB5}&path=open

NASA Evaluation Criteria

- **The principal review criteria or elements (of approximately equal weight) considered in evaluating a proposal are its:**
  - **intrinsic merit,**
  - **relevance to NASA and the solicitation's objectives, and**
  - **cost of the investigation/realism and reasonableness.**

- **The failure of a proposal to be rated highly in any one of these elements is sufficient cause for the proposal to not be selected.**

- **The ROSES program element provides the focused, program-specific objectives that will define precisely what is meant by "relevance."**

- **Reviewers judge each proposal against the stated evaluation criteria and state of the art**

- **Serve as a reviewer and be a rotator**

New Investigator Program in Earth Science

- **Purpose**
  - Support outstanding scientific research and career development of scientists and engineers at the early stages of their professional careers
  - NASA places particular emphasis on the PI's ability to promote and increase the use of space-based remote sensing through the proposed research
- **Initiated in 1995, currently solicited every two years**
- **Special features**
  - Ph.D. degrees after **January 1, 2008** (within the last five years)
  - Single PI; collaboration encouraged (no Institutional or Science PI; no Co-I's)
  - US citizenship or legal permanent residency at the time of selection
  - PI salary limited to a maximum of three months per year; open to individuals in both tenure or non-tenure track positions
- **Requirement of an education & public outreach (E/PO) component dropped in ROSES-13; focus on research only**
  - Anticipated average award size $80-90K

Revolutionary Research . . . Relevant Results

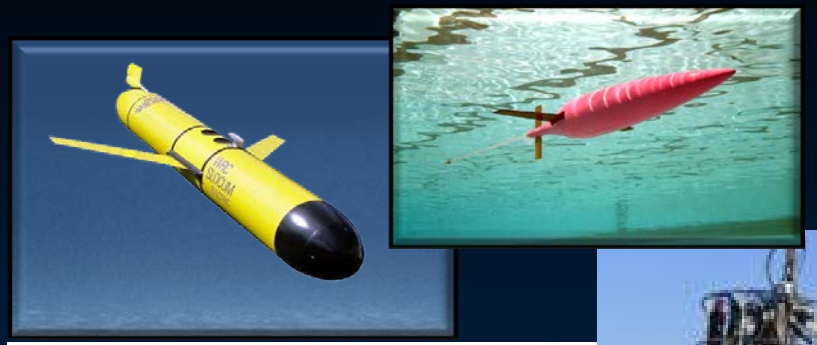
Office of Naval Research
Environmental Research
Quick Overview

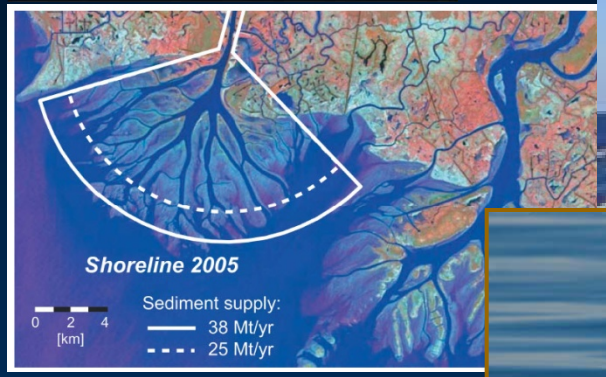
Ocean Sciences
2014

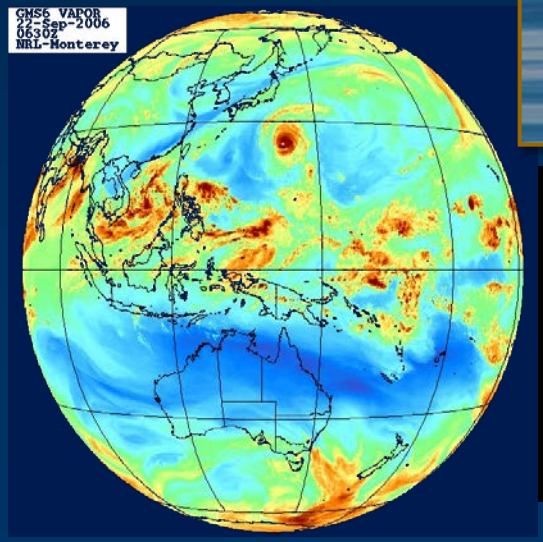
Ocean, Atmosphere, and Space Research Division

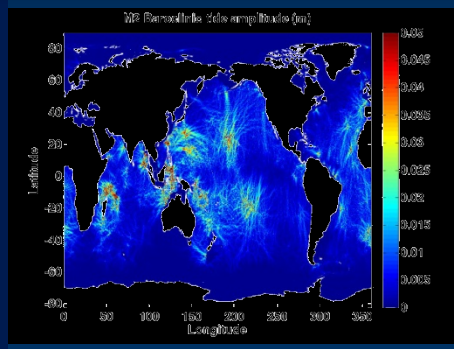
ONR
Revolutionary Research . . . Relevant Results

- Physical Oceanography
- Coastal Geosciences
- Marine Meteorology
- Marine Mammals
- Ocean Acoustics
- Arctic and Global Prediction

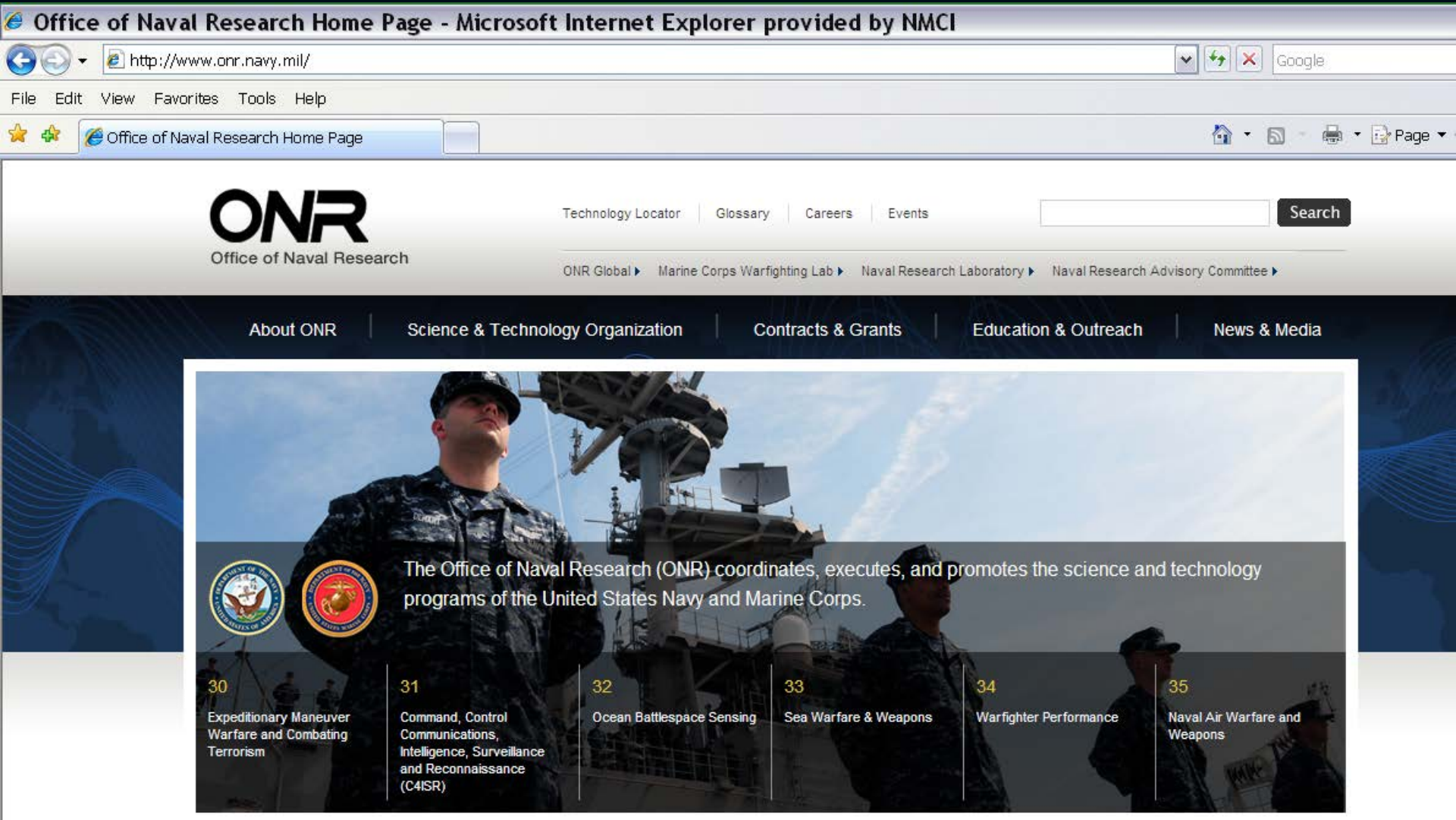








ONR Website: www.onr.navy.mil



THE "OCEAN, ATMOSPHERE, AND SPACE RESEARCH DIVISION" SITS UNDER CODE 32, WHICH IS THE "OCEAN BATTLESPACE SENSING" DEPARTMENT

Proposing to ONR Core Programs

ONR can accept proposals at any time under our open "long-range S&T" ONR BAA 14-001, but most programs at ONR adhere to an **annual cycle**…

February: The Code 32 website is updated with guidance for the next fiscal year. You should access it to learn about any changes to programs, focus areas, or new opportunities.

March/April: **Planning letters** due (Planning letters are 2-3 page summaries of the research you would like to do. We try to provide honest feedback as to whether or not we feel that idea has a chance to be funded by ONR.)

May: Some of the planning letter authors are encouraged to write a full proposal based on the ideas in their planning letter

July: Full proposals due

September: Proposal decisions made

October: Start of new fiscal year – money goes out

Mid-October: Annual reports due for projects funded during the previous year

ONR Young Investigator Program (YIP)

15 - 20 new YIP awards from ONR each year (about 2-4 from Code 32)

Awards are ~$170,000 / year for three years, with the possibility of additional support for capital equipment in the first year and/or collaborative research with the Naval Research Laboratory

A few of the applicants receiving an ONR Young Investigator award will also be selected to receive a Presidential Early Career Award for Scientists and Engineers (PECASE), which provides an additional $200k/year for 5 years

Eligibility: This program is open to **U.S. citizens, U.S. nationals, and U.S. permanent residents** holding tenure track or permanent faculty positions at U.S. institutions of higher education, ***within five years of starting their appointment***

Best advice: Get to know the ONR Program Officers…

- **Arctic Processes & Integrated Prediction**
  - Scott Harper (Scott.L.Harper@navy.mil)
- **Physical Oceanography**
  - Terri Paluszkiewicz (Terri.Paluszkiewicz@navy.mil)
  - Scott Harper (Scott.L.Harper@navy.mil)
- **Coastal Geosciences**
  - Reggie Beach (Reginald.Beach@navy.mil)
  - Joan Cleveland (Joan.Cleveland@navy.mil)
- **Marine Meteorology**
  - Ron Ferek (Ron.Ferek@navy.mil)
  - Dan Eleuterio (Daniel.Eleuterio@navy.mil)
- **Marine Mammals**
  - Mike Weise (Michael.J.Weise@navy.mil)
- **Ocean Acoustics**
  - Bob Headrick (Bob.Headrick@navy.mil)
  - Kyle (kyle.Becker1@navy.mil)

…and read through the **annual reports** from ONR funded scientists (available on the ONR Code 32 website) to get a sense of the kind of research that ONR is currently supporting.