

National Science Foundation

Major Research Instrumentation (MRI)

Program Summary and 2011 Competition Overview Webcast

December 7, 2010

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<http://www.nsf.gov/od/oia/>



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Presentation Overview

- *NSF and NSF Proposals*
- *The MRI Program*
 - *MRI Overview*
 - *MRI in 2010*
 - *MRI in 2011*
- *MRI Proposals*
 - *What Makes a Proposal Fail*
 - *What Makes a Proposal Competitive*



The graphic features the NSF logo at the top left, followed by the text "NATIONAL SCIENCE FOUNDATION MAJOR RESEARCH INSTRUMENTATION". Below this is a section titled "MRI GOALS" with a list of six bullet points. To the right of the text is a grid of 18 small images showing various scientific instruments and researchers. At the bottom left of the graphic, the contact information "MRI@NSF.GOV" and "www.nsf.gov/od/oia/programs/mri" is provided.

NSF NATIONAL SCIENCE FOUNDATION
MAJOR RESEARCH INSTRUMENTATION

MRI GOALS

- Catalyzing new knowledge and discoveries
- Empowering the Nation's scientists and engineers
- Providing state-of-the-art research instrumentation
- Enabling research-intensive learning environments
- Building capacity for a diverse workforce
- Developing next generation instrumentation
- Promoting academic-private sector partnerships

MRI@NSF.GOV
www.nsf.gov/od/oia/programs/mri



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NSF Overview



Physically located in Arlington, VA
Virtually located at <http://www.nsf.gov/>



NSF Overview

- An independent Federal agency
- Created by Congress in 1950 with a mission *"to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense..."*
- Annual budget of about \$7 billion
- Funding source for ~20% of all Federally supported basic research in America's colleges & universities.



NSF Overview

VISION: *Advancing discovery, innovation, and education beyond the frontiers of current knowledge, and empowering future generations in science and engineering.*

GOALS:

Discovery: Advancing frontiers of knowledge

Learning: S&E workforce & scientific literacy

Research Infrastructure: Advanced instrumentation and facilities

Stewardship: Supporting excellence in S&E research and education



**Strategic Plan
FY2006-2011**

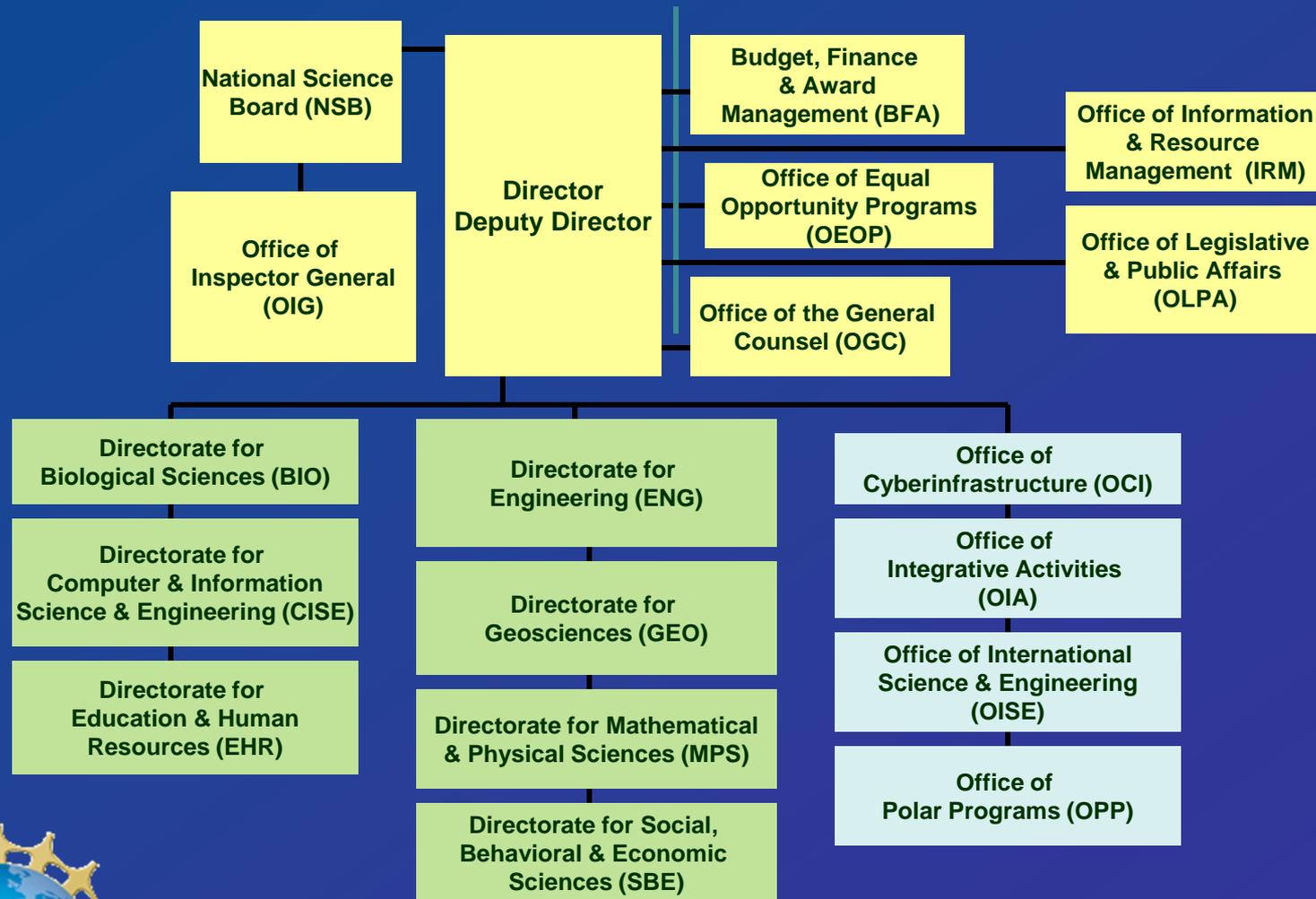


NSF Overview

- **Fulfills mission chiefly by issuing limited-term (3-5 year) grants, mostly to individual PIs**
- **Primarily community driven – “bottom up”**
- **Currently funds about 11,000 new awards per year, out of ~45,000 submitted**
- **Fund research proposals deemed most promising by a merit-review system**
- **Merit-review by panels and mail reviews**



Finding a Home at NSF



Directorates/Divisions → Colleges/Departments

Seeking Funding from NSF

NSF provides the following types of funding opportunities

- Program Description
Published only on the NSF website.
Proposals must follow GPG instructions.
- Program Announcement
Published NSF document describing the program.
Proposals must follow GPG instructions.
- **Program Solicitation**
Published* document with additional restrictions and/or requirements.
Proposals must follow both the solicitation and the GPG instructions
- Dear Colleague Letter
Notifications of opportunities or special competitions for supplements to existing NSF awards.

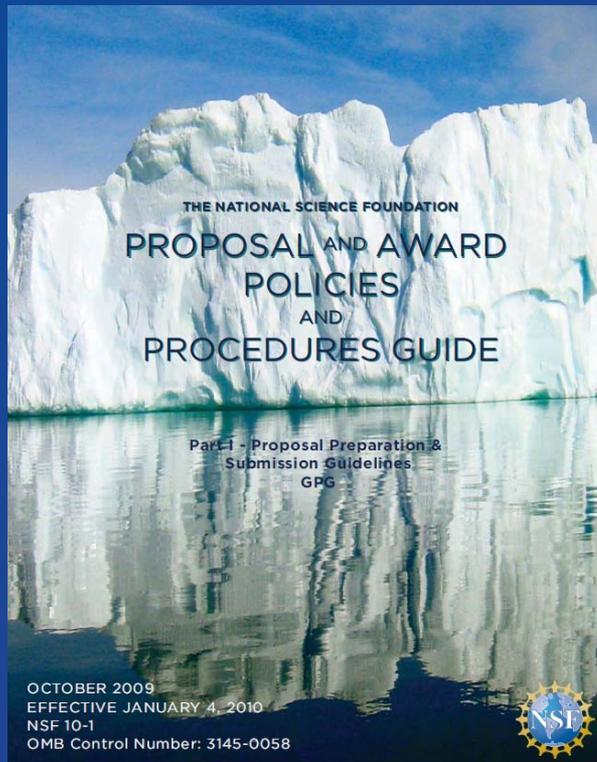
*Solicitations are also published at www.grants.gov



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FastLane Submitted Proposals

The Grant Proposal Guide (GPG)



Proposal & Award Policies & Procedures Guide (PAPPG) describes the proposal and award process

- **Part 1 - Grant Proposal Guide (GPG)** provides guidance for preparation and submission of NSF proposals
- **Part 2 – Guidance on managing and monitoring awards**

Note: A revised version of the NSF Proposal & Award Policies & Procedures Guide, NSF 11-1, will be in effect for the FY11 MRI competition. Proposals responding to an NSF funding opportunity with a due date on or after January 18, 2011, must now comply with the guidelines in NSF 11-1.

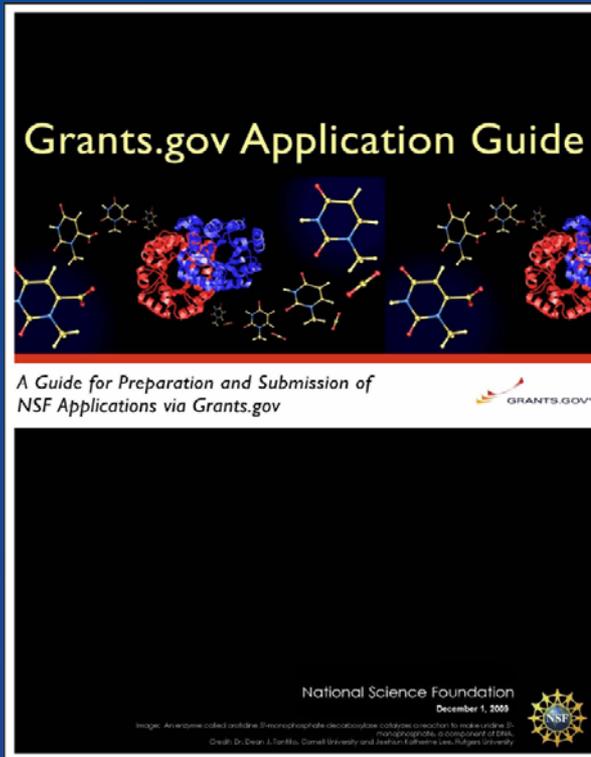
http://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp



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Grants.gov Option

Grants.gov Application Guide



The NSF Grants.gov Application Guide describes the preparation of proposals via Grants.gov.

Simultaneously submitted linked collaborative proposals must be submitted via FastLane because Grants.gov does not currently support this type of submission.

http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide



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Major Research Instrumentation (MRI)

Strategic Goals: Proposals Should Address Them!

- Supporting the **acquisition** of major state-of-the-art instrumentation, thereby improving access to, and increased use of, modern instrumentation shared by the Nation's scientists, engineers, and graduate and undergraduate students;

OR

- Fostering the **development** of the next generation of major instrumentation, resulting in new instruments that are more widely used, and/or open up new areas of research and research training;

AND

- Enabling academic departments, disciplinary and cross-disciplinary units, and multi-organization collaborations to create well-equipped research environments that **integrate research with education**;



<http://www.nsf.gov/od/oia/programs/mri/>

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Programs

Major Research Instrumentation (MRI)

Additional Goals:

- Supporting the acquisition and development of research instrumentation that makes use of, advances, and/or expands the Nation's cyber-infrastructure and/or high performance capability:
 - ❖ Support development of computational and data-intensive science and engineering programs, or
 - ❖ Provide pathways to regional and national infrastructure.
- Promoting substantive and meaningful partnerships for instrument development between the academic and private sectors:
 - ❖ Create innovative ideas or products with wide scientific or commercial impact.



<http://www.nsf.gov/od/oia/programs/mri/>

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Major Research Instrumentation (MRI)

Acquisition versus Development¹

• Acquisition:

- ❖ Little/no modification from existing vendors/sources
- ❖ May involve assembly of readily available components
- ❖ Rapid implementation
- ❖ Limited personnel, limited risk

• Development:

- ❖ Capabilities not otherwise available – accuracy, reliability, resolving power, throughput, sample capacity, flexibility...
- ❖ Design, construction, testing → longer timescales, higher risk (mitigation)
- ❖ Often require more personnel
- ❖ Does not include standard upgrades, simple assembly, porting of application software, development of technologies, products or techniques



¹See solicitation and FAQs for further guidance

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MRI

The MRI Program Will Not Support:

- Construction, renovation or modernization of rooms, buildings or research facilities (instruments must be able to decouple from their host environment);
- Large, specialized experimental facilities (constructed with significant amounts of common building material using standard building techniques);
- General purpose and supporting equipment (e.g., general purpose computers/laboratory equipment, fume hoods, cryogen storage systems);
- Sustaining infrastructure and/or building systems (e.g., electrical, plumbing, HVAC, toxic waste disposal, telecommunications);
- General purpose platforms or environments (e.g., fixed, non-fixed structures, manned vehicles);
- Instrumentation used primarily for science and engineering education courses.

<http://www.nsf.gov/od/oia/programs/mri/>



MRI Proposals – The Basics

- **Restrictions on organization submission eligibility** - see solicitation and next slide
- **Submission limit¹**- Three (3) per organization: *If three proposals are submitted, at least one of the proposals must be for instrument development.*
- **Request size from NSF** - \$100,000-\$4 million from all eligible organizations; < \$100,000 exception for certain disciplines and from non-Ph.D.-granting institutions.
- **Cost-sharing** at the level of 30% of the ***total project cost*** is required for Ph.D.-granting institutions and non-degree-granting organizations. ***Cost-sharing is not required for non-Ph.D. granting institutions.***
- **Merit Review** - At the time of submission, PI's are asked to identify an NSF division(s) to review proposal. NSF reserves the right to place proposals in the appropriate division(s) for review.



¹Proposals that violate this limit are subject to return without review

MRI: Organizations Eligible to Submit Proposals

- 1. Institutions of higher education** acting on behalf of their faculty members, that are accredited in and have a campus in the United States, its territories or possessions.
- 2. Not-for-profit, non-degree granting domestic U.S. organizations** that include (but are not limited to) independent museums and science centers, observatories, research laboratories, professional societies, and similar organizations that are directly associated with the Nation's research or educational activities. These organizations must have an independent, permanent administrative organization (e.g. an office of sponsored research) located in the United States, its territories or possessions, and have 501 (c)(3) tax status.
- 3. Legally incorporated, not-for-profit consortia** including two or more submission eligible organizations as described in items (1) and (2) above. Such a consortium is one with an independent administrative structure (e.g. an office of sponsored research) located in the United States, its territories or possessions and 501 (c)(3) tax status.



<http://www.nsf.gov/od/oia/programs/mri/>

MRI Collaborations and MRI Consortia

- **“Collaboration”** represents a funding mechanism, used NSF-wide, by which investigators from two or more organizations who wish to collaborate on a unified research project may submit proposals and share funding:
 - Single proposal with sub-award(s)
 - Linked Collaborative – simultaneous submission of proposals; separate awards to each organization
 - Unfunded collaborations
- **“Consortium”** represents a submission mechanism for proposals that encourage greater collaboration and sharing of state-of-the-art instrumentation and are submitted by submission-eligible organizations to provide access to unique instrumentation for a broad user base of U.S. scientists and engineers:
 - Legally, incorporated consortia (3a)
 - MRI consortia (3b)



MRI: Classification of Organizations

- **Ph.D. granting institutions of higher education** are accredited colleges and universities that have awarded more than 20 Ph.D.s or D.Sci.s in all NSF-supported fields during the combined previous two academic years. Additionally, any organization that awards Ph.D. or D.Sci. in NSF-supported fields is considered to be a Ph.D.-granting institution if the only degrees it awards in NSF-supported fields are post-Bachelor's degrees.
- **Non-Ph.D. granting institutions of higher education** are accredited colleges and universities (including two-year community colleges) that award Associate's degrees, Bachelor's degrees, and/or Master's degrees in NSF-supported fields, but have awarded 20 or fewer Ph.D./D.Sci. degrees in all NSF-supported fields during the combined previous two academic years.
- **Non-degree granting organizations** are those that do not award Associate's degrees, Bachelor's degrees, Master's degrees, and/or Ph.D.s or D.Sci.s. Non-degree-granting organizations also include institutions of higher education that award all of their degrees outside of NSF-supported fields.



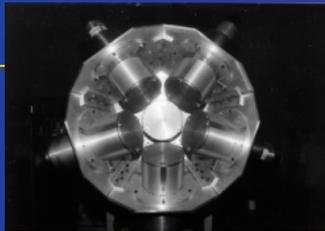
<http://www.nsf.gov/od/oia/programs/mri/>

MRI Highlights

Highlights from MRI FY09

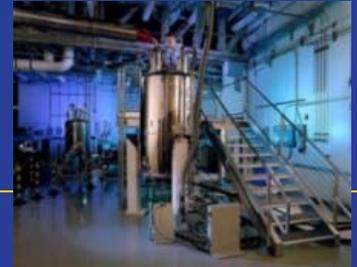
1) \$1,222,620 Award – MPS/PHY
Hope College
Neutron Detector Array

Collaborative award among 9 PUIs to develop the Large-area multi-Institutional Scintillator Array (LISA), to facilitate physics measurements with rare isotope beams at the National Superconducting Cyclotron Laboratory.



2) \$3,948,000 Award
– BIO/DBI Vanderbilt U.
900 MHz NMR Spectrometer

NMRs are frequent requests to MRI because they enable leading-edge scientific research spanning a wide range of disciplines. Most proposals request 400-600 MHz instruments, and request < \$1 million. The availability of ARRA funding made possible the support of this meritorious \$4 million award.

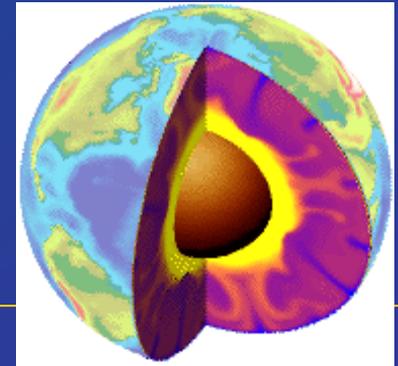


MRI Highlights

Highlights from MRI FY10

1) \$1,979,817 Award – MPS/AST
University of Arizona
Astronomical Adaptive Optics

Award to support the development and commissioning of high resolution laser optics for wide-field adaptive optics imaging with the Large Binocular Telescope (LBT) in Arizona. Observing time will be made available to U.S. astronomers and LBT partners.



2) \$358,369 Award
– GEO/EAR University of Rochester
Atomic Magnetometer

Academic-industry partnership to develop an ultra-sensitive “spin-exchange relaxation-free” (SERF) magnetometer to enable advances in our understanding of the onset of the core formation and dynamo activity, the atmosphere and the biosphere of the early Earth.



2010 MRI Award Snapshot – Overall¹

Number Reviewed: 940 (207 DEV, 733 ACQ)

Dollars Requested : \$626.1 million

Number of Awards: 169 (42 DEV, 127 ACQ)

MRI Amount Awarded: \$85.1 million

NSF Amount Awarded: \$93.1 million

Overall Success Rate: 18.0%

Mean Award: \$551,000

Median Award: \$374,000

Number of Institutions that Participated: 512

Number of Institutions Awarded: 148

¹Does not include \$4.1 million used to fund 28 Grants for Rapid Response Research (RAPID) related to the 2010 Gulf of Mexico oil spill.



2010 MRI Award Snapshot¹

By Institution Type

	Ph.D.	non-Ph.D.	Non-degree	MSI
# reviewed	498 (32% DEV)	400 (9% DEV)	42 (31% DEV)	95
Mean request	\$823 K	\$451 K	\$861 K	\$563 K
Median request	\$632 K	\$362 K	\$504 K	\$385K
# awards	92	69	8	23
NSF \$ awarded	\$66.8 M	\$22.2M	\$4.1 M	\$8.5 M
MRI \$ awarded	\$59.6 M	\$21.5 M	\$4.0 M	\$7.8 M
Success rate	18.5%	17.3%	19.0%	24.2%
Mean award	\$726 K	\$322 K	\$516K	\$368K
Median award	\$451K	\$276 K	\$474 K	\$276 K

¹Does not include \$4.1 million used to fund 28 Grants for Rapid Response Research (RAPID) related to the 2010 Gulf of Mexico oil spill.



2010 MRI Award Snapshot¹ - EPSCoR

Number of Proposals Reviewed: 232

Dollars Requested : \$154.5 M

Number of EPSCoR-eligible Awards: 42

EPSCoR-eligible Success Rate: 18.1%

Amount Awarded to EPSCoR-eligible Awards: \$16.3 M

Eligible proposals co-funded by EPSCoR*: 1

EPSCoR Awarded to EPSCoR-eligible Awards: \$0.2M

Mean award: \$389,000

Median award: \$302,000

¹Does not include \$4.1 million used to fund 28 Grants for Rapid Response Research (RAPID) related to the 2010 Gulf of Mexico oil spill.

*Later than usual MRI submission deadline of April 2010 affected the EPSCoR co-funding process.



2001 - 2010 MRI Award Snapshot

FY	# Proposals	\$ Requested	# Awards	MRI Funding ¹	Total NSF Funding*
2001	741	\$305.5	311	\$74.6	\$78.7
2002	691	\$296.3	279	\$75.7	\$81.3
2003	757	\$351.2	280	\$83.2	\$91.0
2004	838	\$421.4	327	\$109.1	\$112.9
2005	784	\$473.0	256	\$88.8	\$95.6
2006	769	\$427.4	233	\$88.2	\$97.0
2007	774	\$478.3	222	\$89.7	\$96.9
2008	810	\$515.8	224	\$93.2	\$101.0
2009	2019	\$1,724.5	651	\$399.3	\$406.1
2010**	940	\$626.1	169	\$85.1	\$93.1
TOTAL:	9123	\$5,619.5	2,952	\$1,186.9	\$1,253.6

¹includes only awards submitted directly to MRI program

*includes MRI funds and contributions from Directorates and Offices

**Does not include \$4.1 million used to fund 28 Grants for Rapid Response Research (RAPID) related to the 2010 Gulf of Mexico oil spill.



MRI Program Solicitation NSF 11-503

- Proposals considered for **Instrument Acquisition** (3 years) or **Instrument Development** (5 years)
- **Number of Anticipated Awards** based on anticipated FY11 budget of **\$90 million**¹
 - ~150 awards overall¹
 - (up to \$35 million for \$1-4 million awards^{1,2})
- **Anticipated Award Size:**
\$100,000 to \$4 million for either acquisition or development proposals
(no minimum for proposals from non-Ph.D. granting institutions or proposals for fields of mathematical and social, behavioral and economic sciences)

¹Subject to availability of funds

²Subject to proposal quality



MRI Program Solicitation NSF 11-503

Significant Changes

- Inclusion of voluntary committed cost sharing is prohibited.
- All proposals must describe **plans for *data management*** and sharing of products of research, or assert the absence of need for such plans.
- Guidance for proposals that locate instruments at an organization other than the submitting organization.
- Categorization of the requested instrument using codes provided.
- Organization commitment letter must list previous MRI awards to organization from the past five years.
- Requirement for “project outcomes report” available to public 90 days following the expiration of the award.



MRI

What makes an MRI proposal fail before it is reviewed?

The MRI solicitation describes numerous requirements. Proposals must:

- Include only activities **supported by MRI**
- Include only activities **supported by NSF**
- **Distinguish development efforts from acquisition or basic research**
- Not exceed an organization's **submission limit**
- Proposals must **not represent standard research projects**
- Proposal **constraints** exist on efforts involving:
 - Another Federal agency or one of their FFRDCs (consortia)
 - NSF Major Research Equipment and Facilities projects (no augmentation)
- Contain only required and/or encouraged **supplemental documents**
 - Certification of organization type, operations and maintenance
 - Statements of collaboration, etc.



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MRI

What makes an MRI proposal fail before it is reviewed?

Proposals must:

- Demonstrate appropriate levels of ***cost-sharing*** (budget / letter of commitment)
- Conform to ***font, margin and page limitations***
- Address separately ***Intellectual Merit and Broader Impacts*** (Project Summary)
- Include a ***Management Plan*** in the Project Description;
- Include ***Results from Prior MRI Support*** in the Project Description
- Include a ***Postdoctoral Mentoring Plan*** if required
- Include a ***Data Management Plan***

Non-compliant proposals are subject to Return without Review!

Use the checklist in the solicitation!



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MRI

What makes an MRI proposal fail before it is reviewed?

ADVICE:

1) *Submit Well Before the Deadline*

2) *Print and Check the Submitted Proposal*

Is the proposal received by NSF exactly as you intended?

Changes cannot be accepted after the submission deadline



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MRI

So what makes an MRI proposal competitive?

Note we say “competitive”, rather than “successful”!

Due to budget limitations, < 20% of submitted MRI proposals are funded

Even highly competitive proposals may not get funded

Grants programs must be thought of as competitions!



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MRI

What can make an MRI proposal competitive?

- Describe (**enthusiastically**) compelling research / research training activities undertaken by the participants in your proposal → more of the same, while adequate is not compelling;
- Demonstrate how your activities will contribute **within and across disciplines** in both research and research training → unique contributions fare better than keeping up with the competition;
- Match your proposed effort to the **mission of your institution** and describe it in that context → convince reviewers that an award will build capacity to meet well thought out programmatic / institutional goals;
- **Alignment** with regional goals can be of value → societal goals;
- Demonstrate appropriate **leadership and commitment** to bring the project to completion → convince reviewers an award would lead to intended results;
- **Match the budget** / requested resources to the scope of the project → ask for what is needed, no more, no less – justify the request.



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MRI

What can make an MRI proposal competitive?

Competitive proposals must also:

- Demonstrate ***institutional commitment***
- Demonstrate a ***strong management plan***
- Demonstrate ***shared-use*** within the institution, and/or among institutions
- ***Avoid duplication*** of instrumentation that is otherwise reasonably accessible
- Describe ***research training*** particularly among groups underrepresented in science and engineering

Simply avoiding known pitfalls (i.e “Don’t Do This”) will not guarantee a competitive proposal.

The “opposite” of “Don’t Do This” is a vast range of possible approaches, strategies, and designs for your proposal.



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Advice

***Put yourself in the place of a reviewer:
Think of what you as a reviewer would
want to know, not only what you as a
PI want to say!
(if you ask the question, so will they)***



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Seeking Funding from NSF

General Advice:

*Understand NSF before **considering** a proposal*

- Know the Website (www.nsf.gov) → sign up for email updates...
- Search Recent Awards (www.nsf.gov/awardsearch): MRI PE 1189
- Identify possible funding opportunities (www.nsf.gov/funding)
- Talk to Program Officers in Divisions/Offices “where you fit”
- Know the “Proposal and Award Policies and Procedures Guide”
NSF 10-1/NSF 11-1: (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp)
- Know program requirements
- Serve as a panelist!
- Talk to successful PIs
- Understand NSF’s role compared to other Federal agencies



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*Thank
You!*



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