

NSF Major Research Instrumentation (MRI) – Tips from an NSF Program Officer

Advice is from an MRI session at the NSF Grants Conference, led by **Randy Phelps, Staff Associate for the NSF MRI program, in Phoenix AZ, Nov 2017. This document was reviewed and updated by BRDO in Oct 2019.*

Make your proposal stand out. What story would you want to hear as a reviewer? What makes your proposal stand out? Establishing the need for the instrument is not enough. What's unique about what you are proposing? For example: "Everyone claims that the new instrument will help with recruiting students/faculty; this is not unique, it doesn't resonate with reviewers."-*Per R. Phelps.*

Merits of the research. Build your case on the merits of the research that will be enabled by the instrument. Instead of including a series of paragraphs describing the research of individual users, it is much more compelling to develop *several strong themes* that apply to a collection of researchers and highlighting the exciting research that the equipment will enable under each theme. Demonstrate how your activities will make meaningful contributions within and across disciplines in both research and training. NSF is particularly interested in how the instrument will broaden participation.

Building institutional capacity. MRI awards should build institutional capacity. Match your proposed effort to the mission of your institution and describe it in that context.

How many users are enough? The NSF doesn't have a rule of thumb for how many users are appropriate/realistic for an instrument. It's up to the proposer to provide a sound and convincing rationale for the shared use.

Management plan. A solid management plan is essential. Describe plans for scheduling, maintenance, avoiding downtime, accomplishing research goals. Find tangible ways to demonstrate that good managers and best practices are in place. How many PIs have taken a class in project management? What management training and expertise does the PI have to manage the group effort?

Broadening participation. There is increasing emphasis across all NSF divisions in broadening participation. In the current solicitation, emphasis has been added as follows: *"The MRI Program seeks broad representation of PIs in its award portfolio, including women, URMs, and persons with disabilities. Since demographic diversity may be greater among early career researchers, the MRI program also encourages proposals with early-career PIs and proposals that benefit early career researchers."*

Broader impacts. At minimum you must:

- show how you will broaden participation
- describe how the instrument will impact and expand training
- add one unique element that leverages the institution's expertise, location, and/or existing partnerships to address a training gap or an opportunity to broaden participation (for example, an industrial exchange in which students will be trained at your institution and then have a short-term internship using similar technology in an industrial setting).

Acquisition vs. development proposals

- Different divisions within NSF use MRIs in different ways. For example, in chemistry and biosciences, almost all requests are for acquisition, as there are many off-the-shelf instruments available that have the necessary features. By contrast, in materials science and astronomy, development proposals are more common.
- NSF values MRI proposals that aim to develop the next generation of research instruments. To incentivize development proposals, the MRI program aims to allocate at least 20-25% (and up to 1/3) of its total funds for development proposals. *This means that there is more money, proportionally, for development proposals.*

MRI by the numbers: NSF receives ~800-825 MRI submissions per year. Chemistry typically gets 120-140 proposals/year; biosciences 150-160 proposals/year. From 2010-2015, 85% of requests were under \$1M and 90% were under \$1.3M. Requests from primarily undergraduate institutions and those submitted to Social Behavioral and Economic Sciences (SBE) are likely to be at the low end of the funding scale (i.e., \$100K).

What MRI will fund and what it will not fund:

- PIs are advised to pay close attention to what MRI will fund. Refer to the solicitation.
- MRI's goal is to support acquisition and development of major research instruments that increase institutional capacity for research and research training. MRI will fund the instrument, but it will not fund the research that the instrument is used for. Similarly, it will not fund training-related expenses.
- MRI does not support requests for multiple instruments to outfit labs/facilities.
- For acquisition proposals, MRI will support salary for the person directly responsible for instrument operation for the first 3 years. Development proposal may have additional personnel costs related to the development of the instrument, and a project duration of up to 5 years.
- In the current solicitation, statements have been added to emphasize that an instrument need not be physically located in a conventional lab setting, nor does an instrument need to be physical at all.

Cost sharing is *required* for PhD granting institutions. The institution must provide 30% of the total project cost exactly (*no more, no less*). Cost sharing must come from *non-federal* sources. Cost share can be cash or in-kind but must be for *MRI eligible costs*. PIs are advised to calculate the cost share requirement early in the proposal process. Detailed information on cost-sharing is provided in the solicitation.

Where to submit your MRI proposal: Submit your proposal to the appropriate division. *Proposals should not be submitted to the Office of Integrative Activities (OIA).* If the project is multidisciplinary, select a primary and secondary division. Do not select more than 3 divisions as it will cause confusion. When in doubt, consult with the program officer.

Suggesting reviewers: The PI is encouraged to recommend one or more reviewer(s). This is very helpful, as it helps steer program officers to the type of expertise the PI feels is necessary for the review panel.

Submit early! In 2018, NSF adopted a submission *window* (rather than a deadline) for MRI proposals. Yet 80% of proposals come in on the last day (most in last two hours). The 2020 submission window is Jan 1 – Jan 19, 2020. Proposers are advised to submit early if possible.