

So You Want to Write a Cyberinfrastructure Proposal

Henry Neeman, University of Oklahoma

**Director, OU Supercomputing Center for Education & Research (OS CER)
Assistant Vice President, Information Technology - Research Strategy Advisor
Associate Professor, College of Engineering
Adjunct Faculty, School of Computer Science
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Outline

- Instrument Location and Type (MRI/CRI)
- Vision
- Research Activities to be Enabled
 - Includes Results from Prior NSF Support
- Description of the Instrument and Needs
- Impact on Research and Training Infrastructure
- Management Plan
- Cost Share & Institutional Commitment



Major Research Instrumentation





Vision

- Describe the overall project.
- Give your instrument a name. Use it often.
 - It's great if the name obviously relates to your institution.
- Justify: In your first paragraph, quote a report from a national body (e.g., NSF, national academies, etc) saying that this sort of project is important.
- What will be the outcome if the proposal **isn't** funded?
- Give a quick list of research projects.
- Give a quick description of the instrument.
- Provide a table of all projects, including how much of the resource they need, their funding and headcounts.
- If the proposal has no unifying science theme, provide a list of themeless funded MRI grants.





Research Projects

- Each research project to be served by the instrument should have anywhere from a page to a few sentences of description, along with the answers to the questions on the next few slides.
 - Prove that it'll be full all the time, ideally oversubscribed.
- Hero projects should get the most proposal real estate and should come first; gradually reduce the length of later, less shiny projects.
- For a Cyberinfrastructure proposal, the biggest consumers of the resource should be early, but you don't have to go in order of consumption -- go from most compelling to least.





Equipment Proposal Questions #1

- How much funding does your research currently have? How much is pending? Planned? From what sources?
- How many faculty, staff, postdocs, grad students and undergrads on your team will be served by this equipment?
- What makes your research transformational?
- What are the broader impacts?
 - Not just in the STEM research sense
 - Underrepresented populations
 - Integration of education and research
 - Dissemination
 - Societal impact
 - etc





Equipment Proposal Questions #2

- How much of the proposed resource (CPU hours, storage, bandwidth, whatever) do you expect to need over the next N years?
- How did you calculate this amount?
- Please give me a one page summary of your research that incorporates these issues.
 - This is typically straightforward, because faculty often have either a 1 page summary from a grant proposal or a more broad research statement.





MRI/CRI for HPC Cluster Questions #1

- How many CPU core hours or node hours will you need over the next N years?
- How did you determine that?
- Have you benchmarked your code?
 - On what platform?
 - What is the expected performance improvement on the proposed instrument, compared to the platform you benchmarked on?
 - Do you plan to optimize the software? If so, what performance improvement do you anticipate?

<http://www.nsf.gov/pubs/2011/nsf11011/nsf11011.jsp>



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MRI/CRI for HPC Cluster Questions #2

- If the proposal is for a new type of platform (for example, accelerators such as GPUs or Intel Xeon Phi/MIC):
 - Who will be responsible for porting the code to the new platform?
 - If this is either a community code or a commercial code, the porting may already have been done by the developers. Say that.
 - Have they committed to do so? How reliable is that commitment? How is that being funded?
 - What speedup is expected on the new platform?





MRI/CRI for Storage Questions

- How much storage will be needed for this project?
 - If this is a live storage MRI/CRI: What is the maximum amount of storage at a time that will be needed for this project?
 - If this is an archival storage MRI/CRI: What is the total amount of storage needed over the lifetime of the instrument?
- How was that calculated?





CC*DNI Questions #1

- What is the expected typical size of each dataset being transferred?

(It would be helpful to know expected growth rate: Are you expecting it to stay roughly the same over the next several years, or to double every two years, or what?)





CC*DNI Questions #2

- Where are such datasets originating, and where are they being transferred to?
- Why do such datasets need to be transferred between these endpoints?

(That is, what requirement do these data transfers address for your team's research?)





CC*DNI Questions #3

- What is the time window for transferring each such dataset?
- Why does each such dataset need to be transferred during that specific time window?

That is, what's the negative impact of the transfer taking (a) marginally longer and (b) much longer?

- How often do you expect to have such a data transfer need?





Prior Results

- Every NSF proposal has to have a section on “Results from Prior NSF Support.”
- If your team has lots of that, you can’t fit it all. The solicitation and the NSF’s Grant Proposal Guide provide useful guidelines on that.
 - The PI and each Co-PI should each provide the one most relevant grant.
- For an MRI, preference should be given to instrument grants, especially other MRIs.
- If you don’t have anything relevant, say that.
- If you do, is there a way that you can fit this proposal into a more coherent story about how your institution does CI?





Instrument Description

- Give a rationale for the instrument. This reinforces your vision statement.
- Describe the purchase process.
- Describe current similar instruments at your institution or otherwise available to your researchers.
 - Just because there's another one nearby doesn't mean your proposal isn't fundable.
 - Just because there are national centers with bigger resources doesn't mean your proposal isn't fundable.
- Describe the role of the instrument.





Instrument Description

- Describe the instrument in detail. You can express lots of technical information in a modest number of paragraphs.
- Describe how the instrument will be accessed.
- Give the expected performance.
- Describe delivery, installation and operations training.





Impact

- Describe how the instrument will attract researchers. Will it be used to attract new faculty and/or new students?
- Refer back to the research section to describe the impact on your team's research.



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Broader Impacts

- Describe the broader impacts.
 - Impact on STEM research
 - Integration of research and education
 - Underrepresented populations
 - minorities, women, disabled
 - non-PhD-granting institutions
 - rural vs urban
 - Technology transfer
 - Dissemination
- Refer back to the individual research projects' broader impacts.
- You don't need to have all of these items, but have some.
- Your broader impacts are judged on what you've already done.





Management Plan

- Describe the facility where the instrument will reside, in detail.
- Operations labor: who, what credentials, who will manage them.
 - You can make them or their boss Senior Personnel.
- Apportioning: Who will get how much?
- Decision making: Describe the procedure.
- Advisory committee(s)
 - External: one CI, one researcher, one broader impacts.
 - You can also have an Internal Advisory Committee.
- Timeline and milestones
- Sustainability plan: What happens when the grant ends?





Management Plan: Facility

- Where will the instrument reside? (e.g., data center)
- What capabilities does that location have?
 - Space
 - Power
 - UPS? Generator?
 - Cooling
 - Fire suppression?
 - Network
 - Security
 - Accessibility: Describe the path from loading dock to data center floor.





Cost Share

- Mandatory according to the program solicitation.
- Can only be done at exactly the level required.
- There is **NO SUCH THING** as voluntary cost share: if they don't ask for it, you can't include it.
 - Your proposal may be returned without review.
- For MRI, cost share is required of PhD-granting institutions and non-degree-granting, but **NOT** of non-PhD-granting degree-granting institutions.
 - 30% of total project budget (NSF pays 70%)





Institutional Commitment

- Not the same as cost share.
- Not required nor prohibited.
- Strange rules:
 - **CANNOT** mention any dollar figures (or anything that can be straightforwardly translated into dollar figures).
 - **MUST** appear in the Facilities section (preference for at the end).
 - **SHOULD** be confirmed in a letter of commitment from someone who has the authority to commit.
 - **MAY** appear in the project description.





CC: Cyberinfrastructure Plan

- Description of campus network: detail is good!
- Description of statewide network, if appropriate
- Relevant networking grants, if any
- IPv6
- perfSonar
- InCommon
- BCP 38 (or uRPF)
- Connection to Internet2, AL2S, ESnet, etc
- Other relevant services (e.g., Globus Online, Cilogon)

Be concise and specific





OK Supercomputing Symposium 2015



2003 Keynote:
Peter Freeman
NSF
Computer & Information
Science & Engineering
Assistant Director



2004 Keynote:
Sangtae Kim
NSF Shared
Cyberinfrastructure
Division Director



2005 Keynote:
Walt Brooks
NASA Advanced
Supercomputing
Division Director



2006 Keynote:
Dan Atkins
Head of NSF's
Office of
Cyberinfrastructure



2007 Keynote:
Jay Boisseau
Director
Texas Advanced
Computing Center
U. Texas Austin



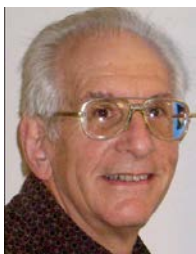
2008 Keynote:
José Muñoz
Deputy Office
Director/Senior
Scientific Advisor
NSF Office of
Cyberinfrastructure



2009 Keynote:
Douglass Post
Chief Scientist
US Dept of Defense
HPC Modernization
Program



2010 Keynote:
Horst Simon
Deputy Director
Lawrence Berkeley
National Laboratory



2011 Keynote:
Barry Schneider
Program Manager
National Science
Foundation



2012 Keynote:
Thom Dunning
Director
National Center for
Supercomputing
Applications



2013 Keynote:
John Shalf
Dept Head CS
Lawrence
Berkeley Lab
CTO, NERSC



2014 Keynote:
Irene Quarters
Division Director
Advanced
Cyberinfrastructure
Division, NSF



2015 Keynote:
Jim Kurose
NSF
Computer & Information
Science & Engineering
Assistant Director

FREE!

**Wed Sep 23 2015
@ OU**

Reception/Poster Session

Tue Sep 22 2015 @ OU

Symposium

Wed Sep 23 2015 @ OU



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Thanks for your
attention!



Questions?

hneeman@ou.edu