

# How Proposals Are Reviewed

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<http://www.novelsemi.com/ProposalReview.pdf>

# Review Methods

Peer Review (NIH, NSF)

Institution (IRB, IACUC)

Internal (GSK, US DOD, VC)



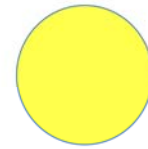
Three kinds of review, each has strengths and weaknesses. A funding organization typically chooses a specific method to suit their needs. There are a lot of commonalities among these methods.

Image:

[http://commons.wikimedia.org/wiki/File:FDA\\_Building\\_66\\_-\\_CDRH\\_\(5160772175\).jpg](http://commons.wikimedia.org/wiki/File:FDA_Building_66_-_CDRH_(5160772175).jpg)

# Reviewers

Do not have a conflict of interest with the proposing organization



## Comprised of

- Employees from funding organization
- Consultants/contractors to that organization
- Scientific peers
- Members of the public



Very rarely is a decision made by one individual. The review panel is almost always comprised of individuals with expertise relevant to the funding opportunity and with four kinds of relationship to the funding organization. In most cases, consultants are used to provide subject matter expertise beyond the scope of the employees of the funding organization. Rarely are consultants given a vote – the decision is usually made entirely by employees of the funding organization. Sometimes the funding organization will provide a list of reviewers and their qualifications – this can help proposers understand the breadth with which their proposal will be reviewed.

Conflict of interest is taken seriously as it has the potential to invalidate the entire funding opportunity. Each funding organization has its own rules on what defines conflict and how to deal with it. Organizations are concerned not only with actual conflict, but also with perceived conflict. At the very minimum, any reviewer that conflicts with a specific proposal will be recused from that discussion. In extreme cases, the reviewer is disqualified from contributing to that specific funding opportunity.

# Evaluation Criteria



Here's where things really start to diverge between funding organizations, but all opportunities will list the criteria over which proposals will be reviewed. The funding opportunity should clearly lay out what the reviewers' expectations are for all successful proposals. Read this closely, the reviewers often debate about the specific wording and value of the criteria prior to publishing the funding opportunity, putting a lot of thought into crafting the funding opportunities. A poorly crafted solicitation will yield poor proposals and poor relations with the proposer community.

Scoring is usually broken down into multiple categories (discussed next slide). These categories can be equal weight or weighted. Scoring can be numerical rank in each category (multiplied by weight to get total score) all the way to narrative strengths and weaknesses. Usually for legal reasons, funding opportunities don't mention portfolio diversity, but it can really be a tiebreaker. It's rare that a scientific organization wants to fund multiple teams to develop exactly the same approach.

Image:

<http://upload.wikimedia.org/wikipedia/commons/6/68/ScientificReview.jpg>

# The Equation: $I > R \times \$$

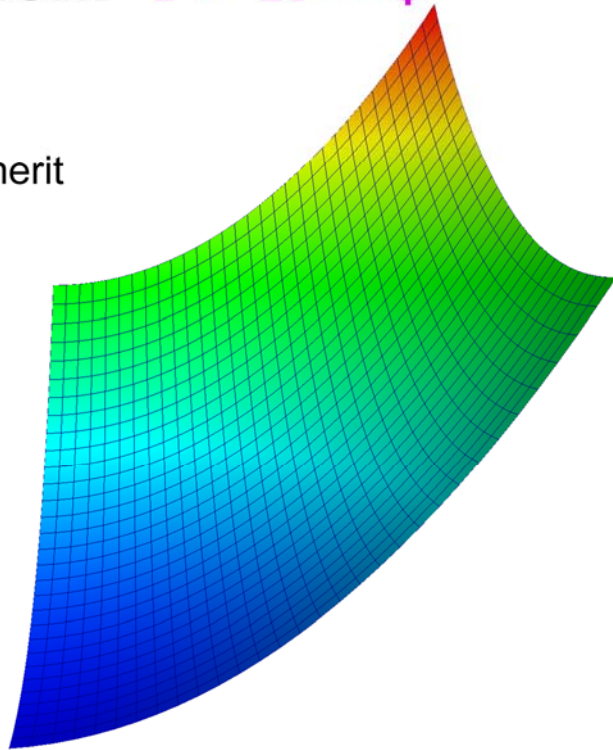
## Impact

- Scientific and technical merit
- Transferability
- Scalability

## Risks

- Feasibility of approach
- Risk analysis/mitigation
- Proposer capabilities
- Schedule realism

## \$ (Budget)



Reviewers need to calculate the risk to benefit ratio times the cost in order to fully assess whether to make a specific investment.

Don't blow off the budget. Every funding opportunity costs the organization something. Reviewers take this seriously, considering whether the work can be accomplished with the proposed budget and whether the budget is reasonable.

Image:

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# Read the Funding Opportunity

Deconstruct the funding opportunity

“Proposals must” vs. “proposals should”

Ambiguity may be intentional

Is your concept in scope?

Don't work around restrictions



Take the document apart and break it down to its constituents in your own language, particularly the hard requirements and the stretch goals. Make sure you meet the hard requirements.

Sometimes funding opportunities have intentional ambiguity. If the solicitation is too specific and asks for A, B, or C, we'll only get proposals on A, B, and C. If the solicitation is too vague and asks for some number of symbols, we'll get ampersand, schwa, pi, and "the artist formerly known as prince". If three letters are solicited, we might get G, S, and K!

Restrictions in the funding opportunity are often thoroughly debated and are present for specific reasons. Don't use a small font to get around page limits, don't claim your bread-slicer is the perfect microtome, and if you're on the hairy edge of being disqualified consider whether reviewers will truly be excited by your concepts. Reviewers have to give every proposal equal consideration, but we're not thrilled about wasting our time.

Images:

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[http://en.wikipedia.org/wiki/Seahorse#/media/File:Black\\_Sea\\_fauna\\_Seahorse.JPG](http://en.wikipedia.org/wiki/Seahorse#/media/File:Black_Sea_fauna_Seahorse.JPG)

[http://en.wikipedia.org/wiki/Halter#/media/File:Horse\\_headshot\\_4397.jpg](http://en.wikipedia.org/wiki/Halter#/media/File:Horse_headshot_4397.jpg)

# Advice

## Read the funding opportunity

Understand objectives of the funding organization

Be thorough

Analytical models  
Expected performance  
Corner cases

Be specific

Be quantitative

Justify



*Apis dorsata*  
107.4 ± 13.2 mg unloaded  
5.4 m/s (from *Apis mellifera*)

<https://hal.archives-ouvertes.fr/hal-00892251/document>

I know the last slide was all about reading the funding opportunity, but it bears repeating. What are the priorities: innovation, demonstrated capability, impact?

What is the funding org. hoping to accomplish by soliciting and funding proposals in this area? NIH: underserved diseases and medical evolution. NSF: fundamental understanding. DARPA: calculated risk for high impact. GSK: be at the forefront of a new industry.

For highly evolutionary research, thorough often means having effectively completed the research already so that there is no risk to the reviewer in selecting your proposal. For revolutionary proposals, thorough means demonstrating analytical models, calculation of boundaries on expected performance, and consider the impact of corner cases.

Seriously, be specific and quantitative. Don't just turn guesses into specific numbers, but provide as much detail as you can – it lends a lot of credibility to the thoroughness with which you've thought through your concepts. For example, if you know which computer you want to buy, it takes just as many words to say "intel-compatible microcomputer" as "i7-class CPU" without having arbitrarily selected an "i7-4790K".

Help the reviewers understand why you made those specific choices. Justify purchasing specific equipment, stretching for a far goal, or using off-the-shelf equipment.

Image:

<https://www.flickr.com/photos/krayker/4312985916>

# Advice

## Be clear

- What has been done
- What will be done
- What might be done

## Deliverables & milestones

## Don't distort reality

## Don't whitewash risks

## Don't waste pages

## Don't be late

Be clear, do not muddle and confuse things by interspersing prior accomplishments, planned work, and future possibilities (but not proposed to be investigated during the proposed effort). It is a simple matter of being consistent with your grammar and properly qualifying the possibilities, e.g. "future efforts might investigate ...", "although funded from another source, our ongoing work will provide insight into ..."

Don't make unrealistic claims about the impact of your proposed innovation. Reviewers aren't idiots and don't like to be treated as such.

The reviewers will know about many of the risks inherent in your approach, so don't be shy. Tackle risks head-on and provide credible evaluation of the severity, from low (doesn't affect outcome) to high (project will fail), and likelihood (from never to unavoidable). For the most critical (i.e. the most severe and likely) provide credible mitigation approaches you plan to use.

You don't have to waste pages explaining the obvious (such as how Bluetooth works), but you will have to justify your specific approach and why it's competitive with credible alternatives.

Image:

<https://www.flickr.com/photos/trailsource/6449555513/>



# Teaming

Multiple investigators are not a **Team**

Integrate

Plan ahead

Find weaknesses

Debate tradeoffs



Sometimes it takes a village. Don't just bolt together individual investigators' ideas and claim it's an integrated program.

It is readily apparent, even at the proposal stage if there is no sharing of thought between investigators.

Start early, so all key individuals have time to comment upon and contribute to the proposal.

It is also readily apparent when expertise and/or capability is missing. Find areas where your teaming structure is weak. Be honest with yourselves about how much you really know.

Seriously debate the trade-offs. Plan to invest heavily in the highest risk elements early, ensure that you don't skimp on critical but unsexy components. Don't distribute funds equally, not every investigator is equally required (or required for the complete duration of the effort) for your effort to be successful.

Image:

<https://www.flickr.com/photos/124961070@N02/14485059353>

# Ask!

Use proper channels

Ask for clarification

Ask for feedback

What did you find compelling?

What were the biggest issues?

Were there fundamental flaws?

Advice for next time?



Often there are restrictions on communication during the solicitation process in order to maintain fairness. The funding opportunity will describe the proper channels for communications. Don't work around the official method by calling the program manager's mobile phone. Typically all potential proposers will have equal access to the funding organization (e.g. all answers posted in a public FAQ).

If the funding opportunity isn't crystal clear, you don't need to guess. Ask. You may get confirmation that the ambiguity is intentional, but you're more likely to get clarity.

Due to the highly litigious society we live in, reviewers all take copious notes. Ask for feedback on your proposal! Usually you'll get a nit-picky technical analysis which protects the funding organization against potential protests. This analysis may or may not be helpful to you, but can't hurt. Occasionally, the reviewers will be blunt and provide a deeper analysis of the structural flaws, your tone-deafness in one area, or insight into what was truly compelling about the awardees. While you may dispute the reviewers' analysis please don't be antagonistic, be informative to help them understand your next proposal better. If nothing else, a feedback conversation can help build your relationship with the funding organization.

Image:

<http://aspiringmormonwomen.org/get-involved/>

# George Heilmeier (1936-2014)

What are you trying to do?  
Articulate your objectives using absolutely no jargon.

How is it done today,  
and what are the limits of current practice?

What's new in your approach,  
and why do you think it will be successful?

Who cares?

If you're successful,  
what difference will it make?

What are the risks and the payoffs?

How much will it cost?

How long will it take?

What are the midterm and final "exams"  
to check for success?



Inventor of the LCD at RCA, CTO of TI, DARPA director who initiated stealth technology  
[http://en.wikipedia.org/wiki/George\\_H.\\_Heilmeier](http://en.wikipedia.org/wiki/George_H._Heilmeier)  
<http://spectrum.ieee.org/consumer-electronics/audiovideo/how-rca-lost-the-lcd>

Image:

[http://en.wikipedia.org/wiki/George\\_H.\\_Heilmeier#/media/File:George\\_H.\\_Heilmeier.jpg](http://en.wikipedia.org/wiki/George_H._Heilmeier#/media/File:George_H._Heilmeier.jpg)

Good luck!

$I > R \times \$$

Read the funding opportunity  
Heilmeier Criteria

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