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Planning proposals

- Intellectual Merit criterion
 - Need to demonstrate how the research project will advance knowledge
 - There are specific guidelines for the Intellectual Merit criterion but it really comes down to how the research advances the field that you are working in
- Finding a home for your proposal
 - Need to pose your idea in flexible terms such that it might fit into various places at NSF
 - Panels are diverse. There is a good chance that there will not be anyone on the panel that is working in your area
 - Sometimes you can find the perfect home, but sometimes you can't and you will need to collaborate with someone – for example there is no directorate for Law at NSF but a team was able to sneak their proposal in by tying their idea to computer sciences
- Program Officers
 - Program Officers are there for you to talk to
 - It's a good idea to visit NSF in person - some schools take PIs to NSF to talk to NSF Program Officers – Talk to your Dept Chair or Dean about this
 - Program Officers make recommendations to the Director but the Director has the ultimate decision and may decide not to fund
 - If you get a high score from the panel and still don't get funded, talk to the Program Officer to find out what went wrong
 - Relationship with Program Officer is critical – start cultivating this relationship as a junior faculty member
 - Important for Program Officer to know who you are and what you do
 - Always do what the Program Officer asks you to do

Melissa Hines, Professor, Chemistry and Chemical Biology, CAS Director, Cornell Center for Materials Research (CCMR)

Strategies for writing strong proposals

- Look up previous awards in your own and related divisions at www.nsf.gov/awardsearch/:
 - What type of research is being funded?
 - Who is being funded?

- What is the typical size of the awards?
- Senior researchers tend to get more money
- The most important part of the proposal is the first page (e.g. page 1 of 15)
 - Reviewer will use the first page as their ammunition in either defending or criticizing the proposal
 - It is very easy to lose the proposal with a bad page 1
 - Be sure to discuss the following points:
 - What are the opportunities?
 - What are the long term goals – 3 years, 6 years from now — assuming that your project is successful?
 - What are the scientific and technical impacts?
 - Why is this a new and novel topic?
 - What are you doing specifically that makes it new and novel? It is not enough for it to be a “hot topic.” You need to explain what you are doing differently
 - Need to sell the proposal as hypothesis driven, as a systematic theoretical approach; should not be Edisonian (e.g. trial and error discovery)
 - Why are you the right/best person to be conducting this project? Why is Cornell the right/best place for the project to be carried out?
- “Power of 3”
 - People can remember 3 things: take the idea and the plan of research and turn it into 3 things: 3 thrusts, 3 foci, or 3 goals
- Make the reviewers’ jobs easy
 - A typical reviewer has to read 12 proposals, each 15 pages long, and s/he has typically put it off until the last minute
 - The reviewer will need to write a review that is going to help them recommend your proposal for funding – the easiest thing is for the reviewer to steal from your proposal to make their point
 - Use a clear set of headers to help reviewers find things easily: Goals –what is this section about, what is it going to do
 - Reviewers will only get the key ideas – they get much less out of the proposal than you put into it
 - Put the important points at the beginning
 - Figures are very important, but choose them and your captions very wisely. For example, don’t put detailed figures in tiny spaces – this doesn’t work well for blowing up the PDF and the figure will not come through properly. The PDF that you submit is not the PDF that reviewers see; it is compressed to lower resolution!
 - Broader Impacts will not make your proposal but a reviewer can use it to kill your proposal

- Results from prior work: don't make a proposal look incremental – should be forward-looking
- Follow the formatting instructions
- Be generous with your attributions – referee will look for their own names in your proposal
- Cite people from National Laboratories as referees
- The majority of the literature review should be within the past 10 years
- Volunteer as a reviewer for NSF
 - it is important to have top-tier institution representation on the panels
 - It is important to get insight into the review process
 - Will teach you the difference between a good proposal and a poor proposal

Chris Schaffer, Associate Professor, Biomedical Engineering, ENG

Addressing Broader Impacts and Finding the right home

- Write for the Review process
 - A reviewer can make a reasonable recommendation on a well-written proposal with a high level review
 - Try to embed the review within the proposal by highlighting the points that you want to be the focus of the review
- Broader Impacts
 - Try to build enthusiasm for the work on the first page
 - Broader impacts are not synonymous with educational outreach – need to demonstrate that there will be societal benefit from the tools that you develop
 - Include educational innovation, outreach
 - Don't forget that you're a scientist when you write this part of the proposal. There are experts in educational innovation and you don't need to be a researcher in educational innovation but you should build off the work of the experts – example: *Science* study published Oct 16, 2009 Teachers' Participation in Research Programs Improves Their Students' Achievement in Science" <http://www.sciencemag.org/content/326/5951/440.full>
 - Example: through this project, I will implement xxx educational innovations that will have xxx impacts
 - There is a lot of help at Cornell for ideas on Broader Impacts: [Center for Teaching Excellence](#) offers seminar series, workshops, one-on-one meetings; [Center for Engaged Learning and Research](#)
 - Don't propose something that is obviously not going to work – you should have some preliminary data that suggests feasibility
 - Outreach and education needs to be stronger on Career Awards than on other proposals

- Finding the right home for your proposal
 - It is not a good idea to send everything to NSF or to the NIH R01
 - Try other sponsors – Foundations, other Federal agencies, State agencies etc
 - Very important to pay attention to the mission of the funder and make your proposal responsive to that mission
 - Keep a catalogue of ideas that you would like to write a proposal on and have them on hand in case the right opportunity arises