

# Grant Writing

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Lab Meeting Mentorship Topics

# Grant Writing

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- Identifying opportunities
- Following instructions
- Getting examples
- Framing the grant
- Formulating aims
- Preliminary data
- Writing
- Getting and using feedback
- Celebrating success and processing rejection

# Identifying Opportunities

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- NIH – F31, F32, F99/K00, K99/R00, others
- NSF – GRFP, others
- Private funding – disease-specific foundations
- Fellowships for specific groups – Ford Fellowships, HHMI Gilliam, HHMI Hanna Gray, L'Oreal Women in Science, Soros Fellowships (immigrants)
- Fellowships offices may have lists/advice - <https://libguides.northwestern.edu/grants>
- Look at other people's CVs, Acknowledgements slides, twitter posts etc and note down when you see others with funding that you think you might also be able to take advantage of
- Can help to keep a list with eligibility criteria to track things like dates

# Following Instructions

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- Read the instructions carefully before beginning work on a grant – verify all eligibility criteria, note due dates, recommendations required, etc
- Make a checklist
- Contact anyone whose help you will need (e.g. recommendations, letters of support) as early as possible
- Make sure every document is technically correct – font, line spacing, word limits, etc – do not get disqualified on a technicality
- Make sure you structure every document to make it exactly clear how you have fulfilled the criteria
- Check the instructions yourself and do not only rely on older examples that may have been created before instructions changed.

Old:

### 15. Vertebrate Animals

If vertebrate animals are involved in the project, address each of the five points below.

If all or part of the proposed research involving vertebrate animals will take place at alternate sites (such as project/performance or collaborating sites), identify those sites and describe the activities at those locations.

Although no specific page limitation applies to this section of the application, be succinct. Failure to address the following five points will result in the application being designated as incomplete and will be grounds for the PHS to defer the application from the peer review round. Alternatively, the application's priority score may be negatively affected.

The five points are as follows:

1. Provide a detailed description of the proposed use of the animals for the work outlined in the Research Design and Methods section. Identify the species, strains, ages, sex, and numbers of animals to be used in the proposed work.
2. Justify the use of animals, the choice of species, and the numbers to be used. If animals are in short supply, costly, or to be used in large numbers, provide an additional rationale for their selection and numbers.
3. Provide information on the veterinary care of the animals involved.
4. Describe the procedures for ensuring that discomfort, distress, pain, and injury will be limited to that which is unavoidable in the conduct of scientifically sound research. Describe the use of analgesic, anesthetic, and tranquilizing drugs and/or comfortable restraining devices, where appropriate, to minimize discomfort, distress, pain, and injury.
5. Describe any method of euthanasia to be used and the reason(s) for its selection. State whether this method is consistent with the recommendations of the American Veterinary Medical Association (AVMA) Guidelines on Euthanasia. If not, include a scientific justification for not following the recommendations.

New:

### Content:

If live vertebrate animals are involved in the project, address each of the following criteria:

1. **Description of Procedures:** Provide a concise description of the proposed procedures to be used that involve live vertebrate animals in the work outlined in the "Research Strategy" attachment. The description must include sufficient detail to allow evaluation of the procedures. Identify the species, strains, ages, sex, and total numbers of animals by species, to be used in the proposed work. If dogs or cats are proposed, provide the source of the animals.
2. **Justifications:** Provide justification that the species are appropriate for the proposed research. Explain why the research goals cannot be accomplished using an alternative model (e.g. computational, human, invertebrate, in vitro).
3. **Minimization of Pain and Distress:** Describe the interventions including analgesia, anesthesia, sedation, palliative care and humane endpoints that will be used to minimize discomfort, distress, pain, and injury.

## 1. Significance

- Explain the importance of the problem or critical barrier to progress that the proposed project addresses.
- Describe the strengths and weaknesses in the rigor of the prior research (both published and unpublished) that serves as the key support for the proposed project.
- Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields.
- Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved.

## 2. Approach

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project. Describe plans to address weaknesses in the rigor of the prior research that serves as the key support for the proposed project. Describe the experimental design and methods proposed and how they will achieve robust and unbiased results. Unless addressed separately in the [Resource Sharing Plan](#) attachment, include how the data will be collected, analyzed, and interpreted, as well as any resource sharing plans, as appropriate. Resources and tools for rigorous experimental design can be found at the [Enhancing Reproducibility through Rigor and Transparency](#) website.
- For trials that randomize groups or deliver interventions to groups, describe how your methods for analysis and sample size are appropriate for your plans for participant assignment and intervention delivery. These methods can include a group- or cluster-randomized trial or an individually randomized group-treatment trial. Additional information is available at the [Research Methods Resources](#) webpage.
- Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims.
- If the project is in the early stages of development, describe any strategy to establish feasibility, and address the management of any high risk aspects of the proposed work.
- Explain how relevant biological variables, such as sex, are factored into research designs and analyses for studies in vertebrate animals and humans. For example, strong justification from the scientific literature, preliminary data, or other relevant considerations, must be provided for applications proposing to study only one sex. Refer to NIH Guide Notice on [Sex as a Biological Variable in NIH-funded Research](#) for additional information.
- Point out any procedures, situations, or materials that may be hazardous to personnel and the precautions to be exercised. If applicable, a full discussion on the use of select agents should appear in the [Select Agent Research](#) attachment below.
- If research on Human Embryonic Stem Cells (hESCs) is proposed, but an approved cell line from the NIH [hESC Registry](#) cannot be chosen, provide a strong justification for why an appropriate cell line cannot be chosen from the registry at this time.
- If you are proposing to gain [clinical trial research experience](#) (i.e., you will not be leading an independent clinical trial), briefly describe your role on the clinical trial.

# Getting Examples

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- Funded examples are critical – they give you a sense of the tone and structure that's likely to be successful
- Seeing the instructions put into practice can be clarifying
- Many examples are useful because you can see the variety of approaches that have been funded and not just one way to do it
- Look up previous awardees and ask anyone you know
- Also ask people you don't – many are generous
- Analyze the examples' structure and commonalities – what makes you excited about reading an example and how can you translate that in describing your own work?
  - <https://www.northwestern.edu/climb/resources/written-communication/index.html>
- Be true to yourself (and don't plagiarize) – examples are just that. Use them to learn but don't feel the need to copy.

# Framing the Grant

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- Why do this project? (Fit justification to funding agency)
- Why this way?
- Why you?
- Why now?
- Why is this money necessary?
- Who will benefit if you are successful?
- Specific deliverables?



# Formulating Aims

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- What does it mean to be related but not interdependent?
- If preliminary data is allowed, think about how to use as much data as you have to your advantage
- It sometimes helps to write aims as questions first
- Write an entire Specific Aims page (or equivalent) to see if you can summarize your reasoning well before solidifying your aims
- Get TONS of feedback on your aims, spend a lot of time at this stage before you dig into the rest of the grant

# Preliminary Data

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- Demonstrate feasibility of a technique – e.g. if you say you will do optogenetics, can you actually do optogenetics?
- Demonstrate a likely outcome – do you have an early indication that there will be exciting results?

# Writing

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- Good writing is clear writing
- Imagine your reviewer is hungover and home with three sick kids and waiting for the cable guy to come and worried about politics and their car just broke down... and this is the 12<sup>th</sup> grant they've read today
- Avoid unnecessary acronyms, especially new ones (e.g. "DA" probably ok for a dopamine crowd, "ASLKDSJ" that you just defined not so much)
- Reduce jargon or unnecessarily fancy words – can you say "use" instead of "utilize"? "Make" instead of "fabricate"?
- Use bold, italics and white space strategically to highlight key points
- A picture is worth a thousand words
- Color code consistently, use consistent formatting
- Maintain excitement for the main message and take aways

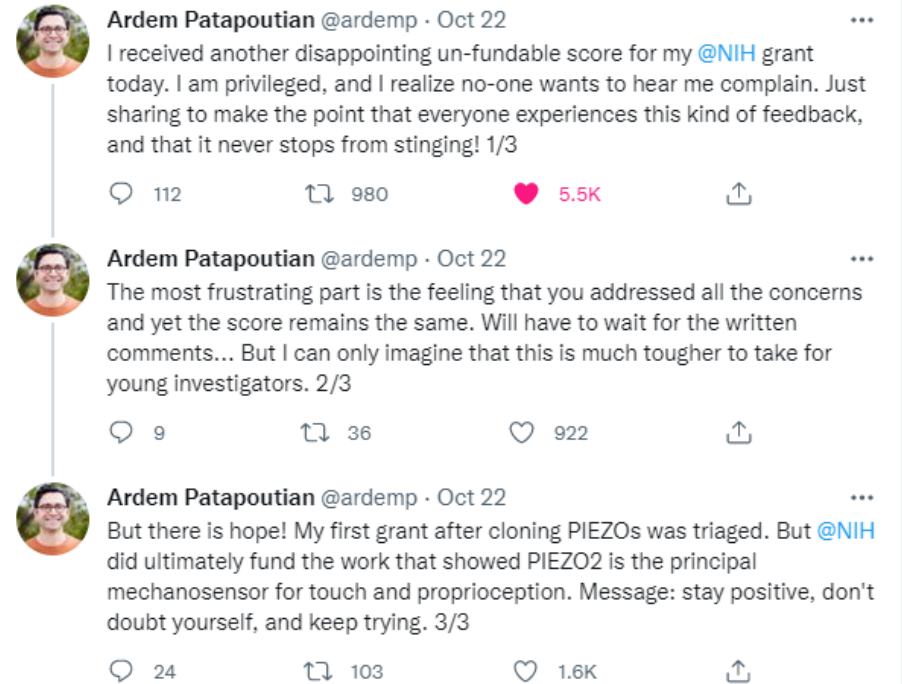
# Getting and Using Feedback

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- Absolutely no one can write a great grant without feedback
- Ask for feedback early and often
- Strive to take all criticism as a chance to learn and improve (even if it's not phrased gently)
- Nothing is too precious to delete (I usually have a file for "Stray Bits" where I put stuff that I need to take out of the grant but don't want to delete entirely)
- Ask mentors, peers, writing groups, grants/fellowship offices
- Take or leave comments (You do not have to respond to every suggestion. Trust your gut.)

# Processing Rejection

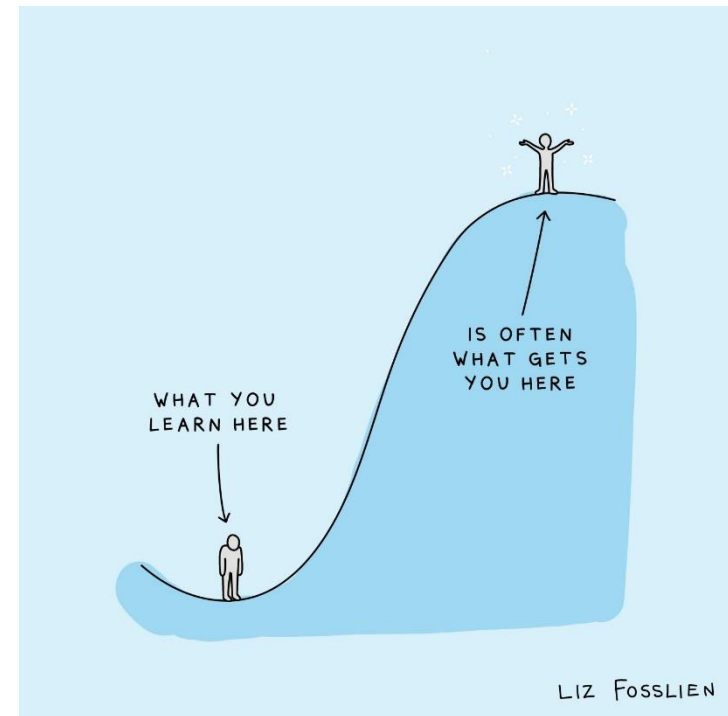
- Rejection is much more common than success. It is a part of science and each rejection is also a growing and learning experience.
- Take the time you need to let it sting – it does, every time! Then, hold your head high and move on.



# Processing Rejection

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- Especially if you get any feedback from the rejection, it's important to come to it with a cool head so you can learn from it.



# Celebrating Success

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- When something good happens, take the time to celebrate it!
- True friends and labmates celebrate together – there is no space for jealousy here – a success for one of us is a success for all of us
- Be proud and take credit for your work! Yes, good luck is involved, but also you are smart and worthy. Your “good luck” is that someone recognized how amazing you and your science are.