

A Research Professional's Grant-Writing Elevator Speech

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Common grant writing advice for faculty, especially new and junior faculty, is to prepare a “**researcher's elevator speech**” that succinctly answers in a few paragraphs the core questions every funder wants answered, and keep it with you at all times, especially at conferences, seminars, workshops, colloquia, etc. where you might meet potential funders of your research:

- What research do I propose to do?
- Why is my research important /significant?
- Why is my research new and exciting?
- How will my research contribute value-added benefits to the funding agency's mission, advance the field, or impact other fields?
- How does my prior research demonstrate my capacity to perform the proposed research?
- Why will my research plan lead to success?

The following two slides **succinctly** describing two multimillion dollar projects funded by ARPA-E are an example of what a “**researcher's elevator speech**” needs to accomplish by **briefly answering** the above key questions. However, **university research professionals** can also benefit by developing their own “**Research Professional's Grant-Writing Elevator Speech**” to answer common faculty questions, as discussed following the slides.

Optofluidic Solar Concentrators

Currently tracking of solar radiation in concentrated photovoltaic systems is provided by mechanical means with multiple moving parts which raises reliability concerns. **These systems are also bulky. We propose to develop a solar concentrator using a novel optofluidic system.** The implementation of the proposed optofluidic system is based on electrowetting. The electrowetting effect controls the contact angle of a liquid on a hydrophobic surface through the application of an electric field. With two immiscible fluids in a transparent cell, they can actively control the contact angle along the fluid-fluid-solid tri-junction line and hence the orientation of the fluid-fluid interface via electrowetting. **The naturally-formed meniscus between the two liquids can function as an optical prism. Without any mechanical moving parts**, this dynamic liquid prism allows the device to adaptively track both the daily and seasonal changes of the Sun's orbit, i.e., dual-axis tracking. **This innovative technology reduces capital costs** for concentrating photovoltaics (CPV) and increases operational efficiency by eliminating the power consumption of mechanical tracking. **Most importantly, the elimination of bulky tracking hardware and quiet operation** will allow extensive residential deployment of concentrated solar power.

Thermal Energy Storage with Supercritical Fluids

Thermal Energy Storage with Supercritical Fluids Two-tank molten salt is **currently the preferred state-of-the art** thermal energy storage for solar thermal power plants. The team will develop a thermal energy storage system which **will significantly reduce the cost and increase the volumetric and mass based energy density**. This team will **develop and implement** a supercritical fluid based thermal energy storage system designed to operate both at moderate (100 – 200 °C) and high temperatures (300 – 550 °C) with a modular single-tank design. Supercritical storage **enables high volumetric energy density** due to the high density of the supercritical state and the ability to provide high temperature storage. The team will **identify and develop fluids with high specific storage capacity and design tanks to enable cost-effective small footprint storage of solar thermal power**. For high temperature storage the volumetric energy density will potentially increase by over a factor of 2 when compared to two-tank molten salt systems, with a cost less than 70% of the molten salt system.

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The key reason for developing “**A Research Professional’s Grant-Writing Elevator Speech**” is to prepare for what often occurs as a brief, random interaction between research professionals and faculty planning to submit a research grant. Such meetings are often inadvertent and **time limited**. In these interactions, the faculty member is often looking for **quick advice** for achieving success in the realm of external funding. In this happenstance situation, the research professional may be tempted to observe, “*I don’t recall seeing you at the well publicized grant-writing workshop our office recently offered.*” But the professional’s task is to describe, in the time it takes to eat a few cookies at a nameless university function, the core essentials a faculty member needs to know to become a more successful applicant for research funds.

What key points should “**A Research Professional’s Grant-Writing Elevator Speech**” address? A good starting point in answering this question is to be prepared to address the five topics below and to elaborate on one or more of them on a moment’s notice, including in the time it takes to travel between floors in an elevator. These topics address many of the questions new and junior faculty ask when starting a research career, and also offer a reminder to more senior faculty of the basic considerations that, in aggregate, contribute to a successful proposal.

- Finding Research Funding
- Analyzing the Funding Solicitation and Its Role in Proposal Development
- Analyzing the Agency Culture, Mission, and Research Priorities
- Understanding the Review Process and How to Write for Reviewers
- Writing a Compelling Project Summary

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The research professional's elevator speech on these topics might be structured to include the below information, but refined to meet your own institutional context.

Elevator Speech: Finding Research Funding

Learn to pack your own chute when finding research funding. Passively waiting to receive funding notices from an undifferentiated subscription listserv or internal email distribution list or from a daisy chain of forwarded emails with funding notices sent as an afterthought by a colleague is not an efficient system. Likely most, if not all, of the information you receive in this way will be of little or only occasional value to you. It amounts to a tsunami of undifferentiated information lacking focus, relevance, and timeliness to your specific research interests.

Instead, visit the websites of agencies or foundations that fund research in your area and focus on learning the funding cycles of grant programs of interest to you. Most agencies and many foundations offer RSS feeds that continuously monitor for updated information and download it to your browser. In addition, you can subscribe to an agency's email alerts that will keep you current on upcoming and planned funding opportunities. Remember, all federal grant opportunities are also posted to Grants.gov. Grants.gov also offers RSS feeds and email alerts that will update your funding information daily. This makes packing your own funding chute really simple, since, as the RSS acronym implies, it offers "*Really Simple Syndication*." To find agency RSS feeds, simply Google "*RSS feeds at 'AGENCY NAME'*," or visit the agency web site.

Keep in mind, however, that published funding opportunities on recurring cycles are only one part of the funding opportunities universe. ***Most agencies and foundations have a process in place for submitting unsolicited or investigator-initiated proposals.*** When you find an agency that funds research of interest to you, make sure you understand the unsolicited grants process. After all, in any given year, typically 50% of awarded grants from NSF and 80% from NIH are unsolicited or investigator initiated. In most cases, the unsolicited proposal process is explained at the agency website or in a currently open agency BAA (Broad Agency Announcement). Moreover, in many cases, the unsolicited proposal process is an abbreviated one, often starting with a short white paper that will be reviewed by the agency to determine whether or not it will then ask you to develop and submit a full proposal. Moreover, writing brief white papers is an excellent way to hone your grant-writing skills and narrative strategies.

Elevator Speech: Analyze the Funding Solicitation and Its Role in Proposal Development

Analyze the funding solicitation. Don't read it just once; read it several times carefully. Explicate the solicitation word by word, sentence by sentence. Most of the flaws in unfunded proposals originate from a (mis)reading of the funding solicitation that is cursory and inattentive to detail and nuance and therefore leads to a poorly understood solicitation. A poorly understood solicitation will result in a proposal that is poorly understood by reviewers. That is time and energy wasted!

Analyze the solicitation to determine whether or not your research is a good fit for the agency and the specific solicitation. Remember, a great research idea is a necessary but not sufficient condition for funding. Your great idea must map to the mission-critical objectives of

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the funding agency and bring value-added benefits to the agency and the research field(s). ***If your research is not a fit, don't submit!***

Use the solicitation to develop a first draft of your proposal. Copy and paste all the agency's questions, goals, objectives, review criteria, information on referenced documents, etc. into a document that will serve as the first rough draft of the narrative. In so doing, you will ensure that your final proposal narrative fully responds to the solicitation and provides reviewers with the requested information in the narrative in the order and with the detail required from the solicitation.

Moreover, after reading the solicitation, you should be able to answer many of the following questions which are relevant to how you write the research narrative, particularly in addressing how your proposed research fits the mission priorities of the agency and what ***value-added benefits worth funding*** you bring to the agency and the research field.

- Why is the agency funding this program?
- What are the origins and history of the program?
- How has the program evolved over time and why?
- What influences have transformed the program and how?
- What is the agency vision for the program going forward?
- How does the program fit in the national research context?
- What reports, workshops, etc., formed a basis for the program?
- How does the program fit the agency's strategic plan?
- ***How does my research fit in this context; why is my research significant to this context; and how will my research impact this context?***

Finally, never hesitate to contact a program officer for clarifications. There are only two certainties in grant writing:

- ***Timidity is NEVER rewarded in the competitive proposal process!***
- ***Ambiguities are ALWAYS punished!***

Elevator Speech: Analyze the Agency Culture, Mission, and Research Priorities

You would no more bring a bowling ball to participate in a curling match than you would submit a nuclear physics project to the National Endowment for the Humanities, or a project on a neglected infectious disease to the Department of Energy's Biological and Environmental Research Office, or submit an applied research project to a basic research agency.

While the two former examples may be unlikely, the latter is too common and represents one of the reasons proposals are declined by program officers and review panels alike. You need to be sufficiently informed about a funding agency and a specific program to know whether your research maps tightly to the solicitation. After all, funding opportunities are designed to advance the agency mission and any funding you receive will be based on how well your research advances the agency's research objectives.

Most agencies make it easy to find the information that will allow you to better understand their culture, mission, and research priorities. Their web sites feature their strategic plans, research roadmaps, agency research reports, and workshops. These, in turn, will help you better understand how best to "pitch" your proposed research to the agency.

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Moreover, going through the process of analyzing the funding agency helps applicants write a more competitive proposal better aligned with the agency mission objectives and answering such important questions as:

- What characterizes a competitive proposal narrative at the agency?
- Who is the audience?
- How do you best address that audience?
- What is a fundable idea within the context of the agency's research priorities?
- How are claims of research uniqueness and innovation best supported in the proposal narrative?
- What arguments are likely to be the most compelling in communicating the significance of your research and its value-added benefits to the agency as well as communicating your capacity to perform the proposed research to reviewers and program officers?

Elevator Speech: Understand the Review Process and How to Write for Reviewers

Understand how your proposal will be reviewed and the criteria the agency will use to judge your proposal before you start writing the proposal. In most cases, the agency will use overarching review criteria, e.g., intellectual merit and broader impacts at NSF, as well as more detailed, in-depth, program-specific review criteria. It is impossible to plan, develop, and write a successful research proposal without first knowing how you will be judged by reviewers and program officers.

Understand the role of the program manager in the review process. At some agencies, the program officers merely ensure that the review process is followed appropriately, while at other agencies, e.g., defense and some mission agencies, program officers play a strong role in determining which proposals are or are not funded. In fact, at some mission agencies, reviewers' recommendations are only one of several factors that will be used in the final award decision. It is of great importance that you know how the agency to which you submit a research proposal will make the funding decision. This knowledge will play a significant role in how you write the research narrative and the arguments you make to convince reviewers and program officers to fund your research.

Also, remember to write for reviewers. Make it easy for reviewers to understand your proposal. You should write it in "user friendly" language that's accessible to the intelligent or scientifically literate reviewer but not necessarily to the expert in your field. Write clearly and simply. Complement your research narrative with visuals that help the reviewers better understand the proposed research. Don't compress the research narrative into a dense "black hole" of compacted information by using the smallest allowable font and eliminating all white space in the document.

Remember, proposals are not journal articles—proposals must be user friendly and offer a narrative that tells a story reviewers will find memorable.

Elevator Speech: Write a Compelling Project Summary

A well crafted project summary is critical to a successful proposal. It is here that you introduce your research ideas to the reviewers. If you write a lackluster project summary, you will have likely lost any possibility that reviewers will continue on to read your research

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narrative with any enthusiasm whatsoever. Moreover, keep in mind Mark Twain's comment in his correspondence with a friend: *"If I had had more time I would have written you a shorter letter."* A clear, simple, one-page description of your research is a document that needs to be ***crafted and drafted repeatedly*** until you converge on perfection. It is in the project summary that you must make clear:

- What research you propose to do?
- Why your research is important /significant?
- Why your research is new and exciting?
- How your research contributes value-added benefits to the funding agency's mission, advances the field, or impacts other fields?
- How your prior research results demonstrate your capacity to perform the proposed research?
- Why the rationale for your research plan will lead to success?

While the above can be modified and adapted to fit various institutional contexts, it is a good plan for research development professionals to be able to quickly distill the essential knowledge of the craft of successful grant writing and convey it to faculty in many settings.