Writing Winning Proposals

Writing for the Reviewers!

Expert Panel	**Gregory T. Rushton, Ph.D.** Director, Tennessee STEM Education Center
	Hanna Terletska, Ph.D. Assistant Professor, Physics and Astronomy

February 9, 2021

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Writing to Win

Greg Rushton, PhD

Tennessee STEM Education Center
Science · Technology · Engineering · Math
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Preparing to Write: The ABCs and the CCCs

- **A**lways **B**e **C**reating/Creative
  - Ideas
  - Problems
  - Partnerships
- Bring ‘Idea Book’ wherever you go
- Talk out your ideas regularly (e.g., family, friends, mentors, students, staff)
- **C**onnect with **C**reative **C**ommunity
  - Be intentional
  - Be selective
  - Be consistent

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Write to Win...

When You're Writing	Manuscripts	Proposals
If Writing were Media...	Lord of the Rings	Shark Tank
Audience	Experts	Experts + NonExperts
Getting to the "YES!"	Good Quality (meets standard)	Best Quality (top X%)
Writing Tense	Past (What's been done)	Future (Imagine what we could do)

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Thank You for Your Interest!

DUE-1949925
DUE-1914813
DUE-1758342
DUE-1660736

R305A180277

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02/09/2021

RESEARCH AND SPONSORED PROGRAMS

Email: hanna.terletska@mtsu.edu

Writing Winning Proposals to NSF

Hanna Terletska
Assistant professor, Fall 2017-present
Physics & Astronomy Department, MTSU
Computational & theoretical study of quantum materials

New faculty perspective

Reviewer for:
- NSF OAC (panel)
- NSF DMR (ad hoc)
- DOE (ad hoc)
- XSEDE (panel)
- ORNL (ad hoc)
- NSF GRFP (panel)

Active grants:
- NSF CAREER DMR # 1944974 (PI)
- NSF OAC #1931367 (PI)
- Oak Ridge Nat Lab CNMS grant (PI)
- NSF XSEDE (Co-PI): comp. time
- DOE INCITE (Co-PI): comp. time

NSF

XSEDE
Extreme Science and Engineering Discovery Environment

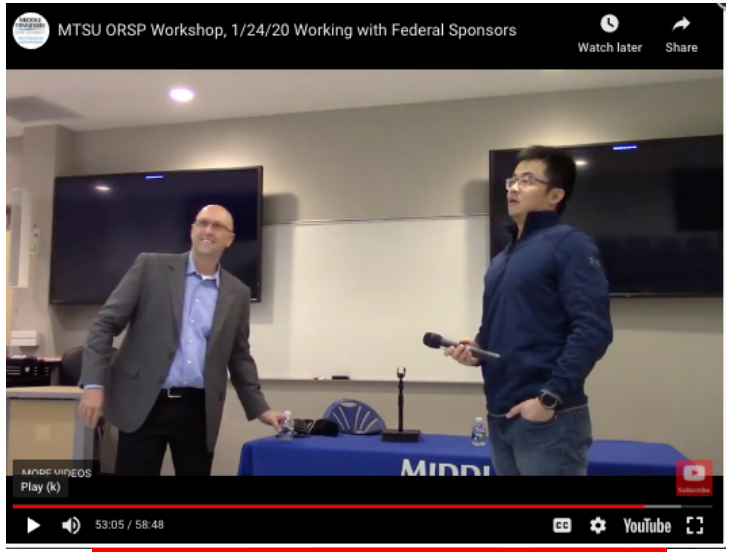
OAK RIDGE National Laboratory | CENTER FOR NANOPHASE MATERIALS SCIENCES

A *New* faculty perspective

"…we are all teaching, have other responsibilities…. How do I *find time* to spend ("waste"?) on a proposal writing…"

"… certain departments lack graduate programs and have *heavier teaching loads…. How do I do grant writing under such circumstances?"*

"…. since MTSU is not considered by the NSF to be a Primarily Undergraduate Institution, the traditional undergraduate-themed funding paths are closed to those doing basic science. *How can I even compete then (with R1 universities)?"*



Last question of ORSP workshop 2020
https://www.mtsu.edu/research/workshops.php

Mentoring is truly critical for the faculty success.
Successful faculty = successful university. Today's focus: learning from your MTSU peers.

Writing Winning Proposals to NSF

Grant writing is a learning skill and a f**ull-time job (acceptance rate ~20%)**.

Only you can teach yourself how to write a winning proposal by doing it.

My teaching load for the last 3 years: 3 classes/semester. New department curriculum launch.

Year1: 2017-2018

1. FRCAC (No).
2. KITP Scholar Award (Yes)-*Fall break.*
3. **ORNL-collaboration (Yes) –***Fall break.*
4. Powe grant (No) –*Christmas break*
5. FRCAC-Spring (Yes)
6. **NSF –collaborative** (No)-*Spring break*
7. **NSF XSEDE (collaborative**, Yes)-*Summer*

Summer-used FRCAC grant to travel to ORNL; talks +new collaborations

Year2: 2018-2019

1. FRCAC (No).
2. **ORNL-collaboration (Yes) –***Fall break.*
3. Powe grant –last try (No) –*Christmas break*
4. **NSF –collaborative 2nd try** (Yes)-*Spring break*
5. **NSF CAREER** (Yes)-*Spring/Summer*

Summer: grant writing; research; talks; traves; student workshop.

Became a reviewer!

- ❑ Be strategic and intentional.
- ❑ Prioritize.
- ❑ Be proactive to make time, schedule blocks of writing sessions.
- ❑ **Learn** from others: talk to your colleagues, Dept. Chair, visit NSF workshops, etc.

Grant application: “writing” proposal is not just about writing

- Think of that **great idea**; Communicate to others why it is so great: how others will benefit from it.
- **Find the right program to sell the idea to**. Read solicitation, Dear Colleague letter, RFA, the description and directions carefully. Identify the key words to anchor to make your proposal **program-relevant**. **Contact the Program Officer.**
- Demonstrate that you are the right person to do it: **establish your research group here at MTSU, publish papers, give talks, train students.**
- Obtain the **preliminary data:** reviewers will know the difference between a grounded hypothesis and a wishful thinking.
- Establish **collaborations**.
- Make yourself **recognizable in the field**, meet your potential reviewers at conference; publish papers, give invited talks.
- Writing: **Examples:** studying successful proposals, might be helpful for New PI to see the best practices for structuring of the proposal.
- Writing: **Write proposal**.
- Writing: **Editing proposal**: have other to read your proposal (ask for the red-line team to rip it off).

Strategic planning & Timing is important

Write stuff:

- **You are <u>selling</u> your product "your great idea" to the reviewers and the NSF program.**

- Tell them: what you want to do and why (outcome)? Why you are the right person to do it?

- Convince them that it is right, safe and timely to invest in you and your idea.

Write stuff: Good idea is not enough; you need to sell it.

WRITING *FOR* REVIEWERS

1. Reviews do not read your application because they want to; they read it because they have to.

2. Understand the review process. Who and based on what criteria will review your proposal (experts, non-experts, ad-hoc reviews, panel).

3. Don't make reviews think hard, work hard; make it easy for them. Give reviewers exactly they need to fully and fairly review your proposal.

4. First 2 pages are critical to maximize the reviewers' friendliness. You need to "hook" their interest, so they would want to read the details.

5. The reviews will see if this is the last-minute proposal, or that you have actually put efforts into it.

Become a reviewer yourself!

I have been a reviewer for:

- NSF OAC (panel)
- NSF DMR (ad hoc)
- DOE (ad hoc)
- XSEDE (panel)
- ORNL (ad hoc)
- NSF GRFP (panel)

Good communication and presentation is the key.

Merit review criteria: know how your application will be evaluated

- **Intellectual Merit**: the potential to **advance knowledge**
- **Broader Impacts**: the potential to **benefit society**

The reviewers need to find the information in your proposal to answer the following questions:

1. What is the potential for the proposed activity to:
a. **Advance knowledge and understanding** within its own field or across different fields
b. **Benefit society or advance desired societal outcomes.**

2. To what extent do the proposed activities suggest and explore **creative, original, or potentially transformative concepts**?

3. Is the **plan** for carrying out the proposed activities **well-reasoned, well-organized, and based on a sound rationale**? Does the plan incorporate a mechanism to **assess success**?

4. How well **qualified is the individual, team, or organization** to conduct the proposed activities.

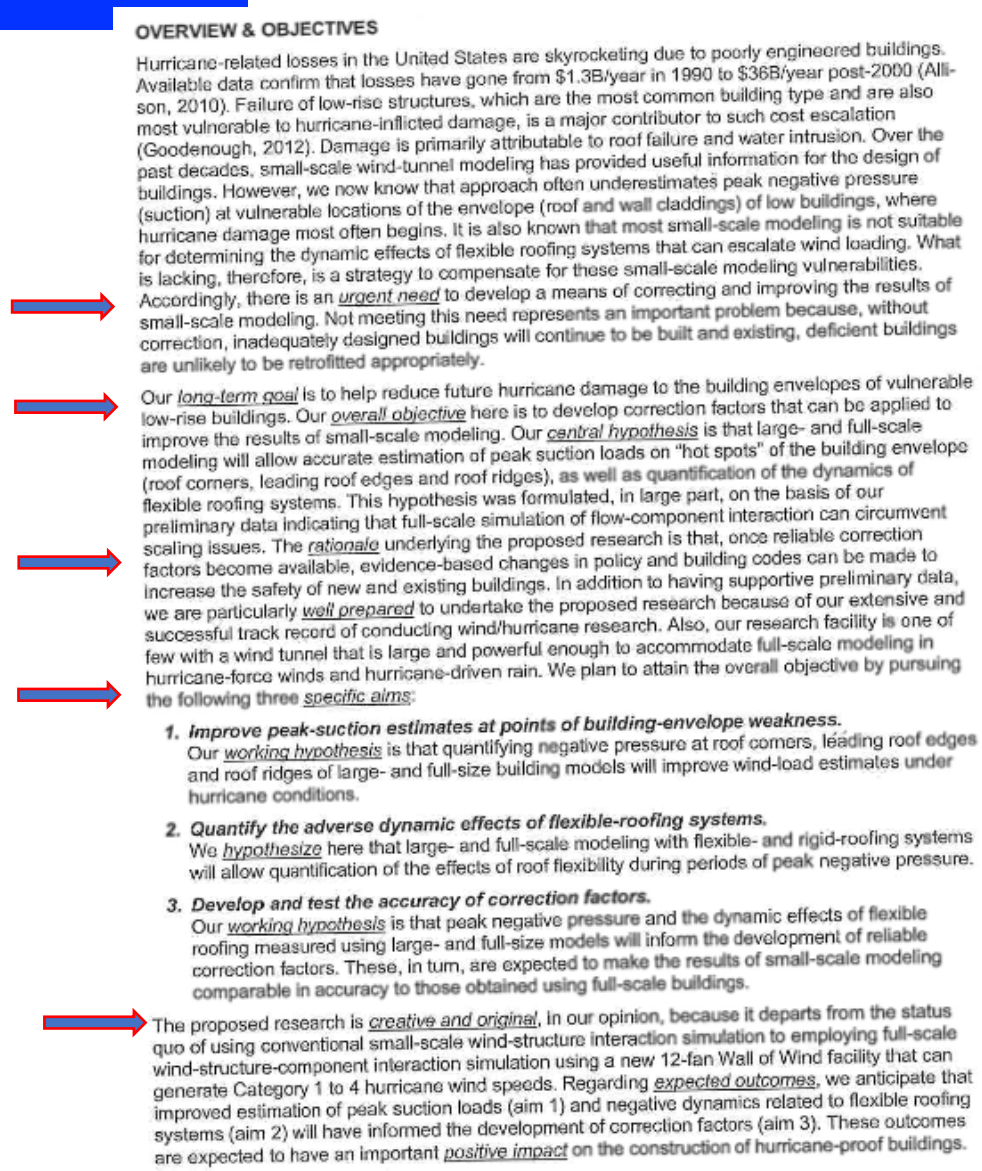
5. Are there **adequate resources available** to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Good presentation

First two pages …a roadmap for the remaining pages.

- Use the first 2 pages to show that you understand the sponsor's objectives, establish your objectives, and frame a *compelling* argument.
- Be clear and write in simple-declarative sentences. Every paragraph must flow logically.
- Be specific: heavy (generic) worded sentences often send empty messages, which reviewers notice ("my research will advance the field of physics significantly").
- Avoid weak words, e.g., hope, try, believe, etc.
- Formatting and well structure are very important. use headings, subheading; bold text (be careful)...
- Take time to make a good quality figures.

Serve on a review panel on do an ad-hoc review to learn how to write for reviewers. ***Evaluate what you write as though you are a reviewer.***



OVERVIEW & OBJECTIVES

Hurricane-related losses in the United States are skyrocketing due to poorly engineered buildings. Available data confirm that losses have gone from $1.3B/year in 1990 to $36B/year post-2000 (Allison, 2010). Failure of low-rise structures, which are the most common building type and are also most vulnerable to hurricane-inflicted damage, is a major contributor to such cost escalation (Goodenough, 2012). Damage is primarily attributable to roof failure and water intrusion. Over the past decades, small-scale wind-tunnel modeling has provided useful information for the design of buildings. However, we now know that approach often underestimates peak negative pressure (suction) at vulnerable locations of the envelope (roof and wall claddings) of low buildings, where hurricane damage most often begins. It is also known that most small-scale modeling is not suitable for determining the dynamic effects of flexible roofing systems that can escalate wind loading. What is lacking, therefore, is a strategy to compensate for these small-scale modeling vulnerabilities. Accordingly, there is an *urgent need* to develop a means of correcting and improving the results of small-scale modeling. Not meeting this need represents an important problem because, without correction, inadequately designed buildings will continue to be built and existing, deficient buildings are unlikely to be retrofitted appropriately.

Our *long-term goal* is to help reduce future hurricane damage to the building envelopes of vulnerable low-rise buildings. Our *overall objective* here is to develop correction factors that can be applied to improve the results of small-scale modeling. Our *central hypothesis* is that large- and full-scale modeling will allow accurate estimation of peak suction loads on "hot spots" of the building envelope (roof corners, leading roof edges and roof ridges), as well as quantification of the dynamics of flexible roofing systems. This hypothesis was formulated, in large part, on the basis of our preliminary data indicating that full-scale simulation of flow-component interaction can circumvent scaling issues. The *rationale* underlying the proposed research is that, once reliable correction factors become available, evidence-based changes in policy and building codes can be made to increase the safety of new and existing buildings. In addition to having supportive preliminary data, we are particularly *well prepared* to undertake the proposed research because of our extensive and successful track record of conducting wind/hurricane research. Also, our research facility is one of few with a wind tunnel that is large and powerful enough to accommodate full-scale modeling in hurricane-force winds and hurricane-driven rain. We plan to attain the overall objective by pursuing the following three *specific aims*:

1. ***Improve peak-suction estimates at points of building-envelope weakness.*** Our *working hypothesis* is that quantifying negative pressure at roof corners, leading roof edges and roof ridges of large- and full-size building models will improve wind-load estimates under hurricane conditions.
2. ***Quantify the adverse dynamic effects of flexible-roofing systems.*** We *hypothesize* here that large- and full-scale modeling with flexible- and rigid-roofing systems will allow quantification of the effects of roof flexibility during periods of peak negative pressure.
3. ***Develop and test the accuracy of correction factors.*** Our *working hypothesis* is that peak negative pressure and the dynamic effects of flexible roofing measured using large- and full-size models will inform the development of reliable correction factors. These, in turn, are expected to make the results of small-scale modeling comparable in accuracy to those obtained using full-scale buildings.

The proposed research is *creative and original*, in our opinion, because it departs from the status quo of using conventional small-scale wind-structure interaction simulation to employing full-scale wind-structure-component interaction simulation using a new 12-fan Wall of Wind facility that can generate Category 1 to 4 hurricane wind speeds. Regarding *expected outcomes*, we anticipate that improved estimation of peak suction loads (aim 1) and negative dynamics related to flexible roofing systems (aim 2) will have informed the development of correction factors (aim 3). These outcomes are expected to have an important *positive impact* on the construction of hurricane-proof buildings.

Source: NSF Grant's application workbook

Last, but not least

- Writing is hard, **devoting plenty of time** to the task is a must. Some recommends setting aside a week for each page of a proposal. It can take months to get a proposal together.

- Scheduling should include **time for rewrites, proofreads and secondary reads** by friends, colleagues and family members.

- Working right up to the deadline can undo weeks to months of hard work.

Stick to the plan by doing what you have planned

My red-line team

Dr. Ron Henderson
Department Chair,
Physics & Astronomy

Dr. John Wallin
Director, COMS
Program

Dr. Bill Robertson
MTSU Career
Achievement
Award Winner

Sharon Felton
Writing editor

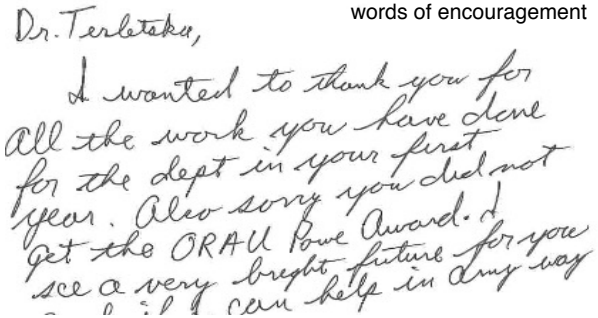
Rejection is the part of the game. How to deal with it?

NSF does aim for inclusion and diversity among funded universities and scholars.

- **It is hard: a** lot of New faculty often find those rejections really tough to take and personal. It is OK to be sad, angry, cry, grieve…. But don't let it set you back! Try! Fail! Try again!
- **Share your rejection** with a friend, Dept Chair, Dean, Program Directors at MTSU, colleagues. They might not just provide a support but also give you a useful feedbacks and words of encouragement.

- Being a renowned scientist doesn't ensure success. Carol Greider (molecular biologist won a Nobel prize in 2009) - same day, a Nobel prize and a grant rejection. "On the same day you win the Nobel prize, skeptics may still question whether you really know what you are doing".
- Negative feedback might be **a good learning <u>experience</u>**; one can learn much from the rejected grants.

words of encouragement


Dr. Terletska,

I wanted to thank you for all the work you have done for the dept in your first year. Also sorry you did not get the ORAU Powe Award. I see a very bright future for you

- **Seek the feedback**: contact the program director (AFTER you calm down. **<u>Never</u>** call when you are angry or upset.)

Great article on how to deal with grant rejection: https://www.nature.com/articles/d41586-020-004550#:~:text=Put%20the%20application%20to%20one,grant%20when%20you%20are%20ready.

Thank you for your interest and participation!

Good luck, hard work will pay off eventually.

We want to hear from you. Send us your feedback.
Email me if you want to chat more
hanna.terletska@mtsu.edu