Every Proposal Needs a Story

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Being intentional

Basic grant writing strategies apply to almost any proposal

And so you just threw everything together?… Mathews, a posse is something you have to organize."

From The Far Side by Gary Larson
Key Strategies

Avoid common trouble spots

• tell a compelling story
• respond to solicitation
• answer “Why us?”
• know your reviewer
• internal review before submission
Having a story does not “dumb down” your ideas

If you can’t explain it simply, you don’t understand it well enough. Most of the fundamental ideas of science are essentially simple and should be described as simply as they can be but not simpler.

Albert Einstein
Building the Storyline

Four helpful questions to build your flow of logic

• What is the problem?
• What has been done already to address the problem?
• What is the gap that remains?
• How do you propose to address this gap?
Building the Storyline

Logic flow goes from broad to narrower

- What is the problem?
- What has been done already to address the problem?
- What is the gap that remains?
- How do you propose to address this gap?
Building the Storyline

Storyline first!

Give me six hours to chop down a tree, and I will spend the first four sharpening the axe.

Abraham Lincoln (well, allegedly)
Building the Storyline

**Storyline first!**

- storyline provides the “north star”
- helps you not to be overly ambitious, a common problem of new investigators

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**General 10-week proposal preparation timeline**

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**Problem Overview**

- What is the problem
- What has already been done to address problem
- What gaps remain
- How we propose to address gaps

**Vision/overarching goal**

**Goals/aims**

**Identify proposal win themes/discriminators**

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**Program Officer Input**

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**Proposed Outline**

- Discuss/refine outline structure
- More detailed outline, if needed
- Identify graphics needed

**Partnerships**

- Recruit collaborative partners
- Produce “talking points” brochure or website
- Recruit industry affiliates
- Recruit advisory board members
- Collect letters of commitment

**Management and Personnel**

- Identify basic management structure
- Collect biosketches

**Proposal Writing and Editing**

- Assign writing
- Write section components
- Compile 1st draft
- Project team 1st edit
- Any outside review input/edit
- Editing iterations
- Write summary or abstract

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*Red Text: Important to have agreement (and explicit text for problem overview) prior to proposal writing*
Building the Storyline

Example narrative...in op-ed language

What is the problem?
What has been done already to address problem?
What is the gap that remains?
How do we propose to address this gap?

NSF IGERT: Solar Economy IGERT (SEIGERT)
PI: Rakesh Agrawal

2. Vision, Goals, and Thematic Basis

Currently, fossil fuel resources of coal, natural gas and petroleum supply nearly 85% of the total energy needs of the US economy. The flow of energy from fossil fuels to end-uses: 1) electricity, 2) heating, 3) chemicals, and 4) transportation is a complex system dictated by resource availability, processing capacity, government policy, world affairs, and market forces. However, recent volatility of petroleum prices, uncertainty of future carbon taxes, and the potential impact of greenhouse gases on the environment has led to renewed efforts to reduce our dependence on fossil fuels.

Recently, 25 U.S. state legislatures passed legislation that establishes minimum percentages of the state’s electricity supply that must come from renewables by a certain date. These so-called Renewable Portfolio Standards (RPS) are shown in Figure 1. The states with RPS account for over half the nation’s electricity. The implementation of RPS presents the U.S. with great opportunities and challenges. Currently, the total primary power used in the U.S. by all four major end-uses is 3.3 TW (PCAST, 2006). When averaged over day, night, seasons, and cloud cover, over 1800 TW of sunlight falls on U.S. land. Clearly, economic collection and transformation of solar energy can provide a long-term solution for all the energy needs of the United States.

For decades, the U.S. enjoyed global leadership in solar energy innovation and market share. By 2005, however, the U.S. share of the world production capacity of solar cell modules dropped to 8% while shipments from Europe and Japan increased to 26% and 48%, respectively (EIA, 2007). The economic effect of the decreasing U.S. market share is exacerbated by a rapidly increasing need for solar cell manufacturing. The U.S. Photovoltaic Industry Roadmap foresees a 30% growth of the world solar industry over the next decade and a U.S. solar industry that needs to employ 250,000 people by 2030 (DOE, 2001). However, at a time when U.S. states and industry need a significant increase of highly skilled labor with solar energy expertise, the supply of Ph.D.s in this area is limited. Further, of all the research articles published on solar energy, the fraction published by U.S. authors has dropped significantly in the last 30 years, from 49% to 18%. More importantly, of all the journal citations for articles on solar energy, the fraction of citations that U.S. authors receive is down from 61% to 24% in that same time period (Hillhouse, 2007). The output and impact of U.S. research on solar energy is diminishing. These trends clearly define a challenge of national importance. It is imperative that the U.S. strategy include effective education and training programs to develop the human resources and intellectual capital that will allow us to compete in this emerging world market for Sun-to-Electricity. Our vision is to prepare for a fossil fuel-deprived world where nearly all energy demands are met sustainably by solar energy resources.
Building the Storyline

Example narrative #2...in op-ed language

NSF ADVANCE: Purdue Center for Faculty Success
PI: Cordova

Introduction
Technological innovation is one of the strongest drivers of economic growth, and succeeding globally requires us to tap into our entire national talent pool. To achieve this, we must break down all barriers that prevent women from contributing fully in academic science and engineering. Efforts by ADVANCE and other programs to identify and address these barriers have led to a substantial portfolio of strategies and tools for producing a stronger and more inclusive science, technology, engineering, and mathematics (STEM) academy. Despite these advances, however, progress in faculty representation continues to come at a glacial pace and with unequal results (Ezkowitz, Kemelgor, and Uzzi, 2000; Somer and Holton, 1996). Female science and engineering faculty have increased only 3% over the past five years to reach a current national STEM representation of 17% (Nelson, 2007), and women are still more likely than men to be positioned in lower academic ranks (Trowe and Chaff, 2002).

Disparity by race and ethnicity also persists as minority men and women continue to progress less successfully through academic ranks than their majority colleagues. The number of underrepresented minority faculty in the top 100 science and engineering departments increased by only 0.5% over the last five years, to reach 5%, and most are assistant professors (Nelson, 2007). The situation is even less encouraging for minority STEM women, who decreased one percentage point in that same time period and constitute only 3% of science and engineering faculty in four-year academic institutions (NAS, 2007).

Purdue University has historically mirrored this national landscape. Our moderately low representation of women in the STEM faculty ranks, nearly invisible percentage of underrepresented minority STEM faculty women, and low representation of women in positions of departmental and center leadership is not due to a lack of talent but instead, as argued by the National Academy of Sciences, to “unintentional biases and outdated institutional structures that are hindering the access and advancement of women” (NAS, 2007).

Purdue has made major strides over the last ten years to address institutional issues impinging on our women STEM faculty. While strong interventions have positively shaped the Purdue academic climate, however, we have lacked a focused, coordinated, and comprehensive program that can strongly promote the recruitment, retention and advancement of STEM women faculty. We need a major change in the organization and empowerment structures that extend from the faculty level to the highest level of leadership in order to realize the fullest measure of institutional transformation. The proposed Purdue Center for Faculty Success will provide this major change. Targeted programs and a new University-level coordination of recruitment, retention, and faculty advancement will have a major impact on STEM faculty women and, in particular, minority women. The Center will undertake social science research, develop programs focused on gaps in our current portfolio of initiatives, and provide comprehensive evaluation of programmatic impacts. University leaders and policymakers, including Purdue President and ADVANCE PI France Cordova, will use the Center’s work to inform continued development of institutional policy.
Building the Storyline

Where do you put it?

- as soon as possible!
- follow prescribed format in solicitation
- common options
  - Background
  - Rationale
  - Vision and Goals
Email your program officer and tell us about your idea. We can tell you if you are heading down the wrong track, or if we just funded three million projects with the same idea. We can save you a lot of time and effort.

—a real, live NSF program officer
Building the Storyline

Create a one-page brief. This is NOT your NSF one-page summary.

One-page project description sent to program officer that includes:

• concise storyline
• vision/goals
• team
• methodology/approach
• impact
Building the Storyline

Because sometimes what is obvious to you is not obvious to others
Practice
GSE/RES Proposal

Examining Engineering Perceptions, Aspirations, and Identity among Young Girls

Project Description

Introduction

The incredible shrinking pipeline of women engineers is attributed in part to girls being unable to envision themselves as successful engineering professionals [1]. Initiatives, such as “Introduce a Girl to Engineering Day” and the “Engineering Girl!” provide young women with information about the profession, but do little in the way of helping young women develop an engineering identity [2,3]. Additional efforts, including K-12 outreach initiatives, such as “Teach Engineering” and “Engineering, Go For It!” provide extensive curricular, instructional, and career resources for teachers, students, and parents, yet fall short in helping girls make connections between learning and understanding engineering and becoming a member of the engineering community of practice [4,5]. What is perhaps surprising is that researchers in STEM education, specifically engineering education, have studied relatively little about how pre-adolescent girls begin to construct their earliest conceptions of engineering, potential career aspirations, and how these conceptions and career aspirations interrelate with their own identity development as young women, students, and prospective engineers. To further understand girls’ engineering conceptions and aspirations, our research team will utilize identity theory to uncover, evaluate, and explain the multiple and diverse factors that contribute to young girls’ engineering identity formation.
New Proposal

Brainstorm on a storyline

• What is the problem?
• What has been done already to address the problem?
• What is the gap that remains?
• How do you propose to address this gap?