Developing Grant Proposals

Purdue grant writing strategies and assistance

Sally Bond
Assistant Director of Research Development Services
Proposal Coordination
Office of the Vice President for Research
and Partnerships

PURDUE
UNIVERSITY

Grant Writing Assistance and Resources

- Overview
- Getting Started
- Storyline Strategy
- Request Grant Writing Help
- Boilerplate Text
- Data Management Plans
- Biomedical Research Development
- Self-Help Tools
- Broader Impacts
- Agency Resources

Grant Writing Support

Welcome to the Research Development Services grant writing support site. Here you can access resources for your proposal development as well as request hands-on help from our team of grant writers. If you have any questions, contact **sbond@purdue.edu**

Research Development Services Website

Getting Started

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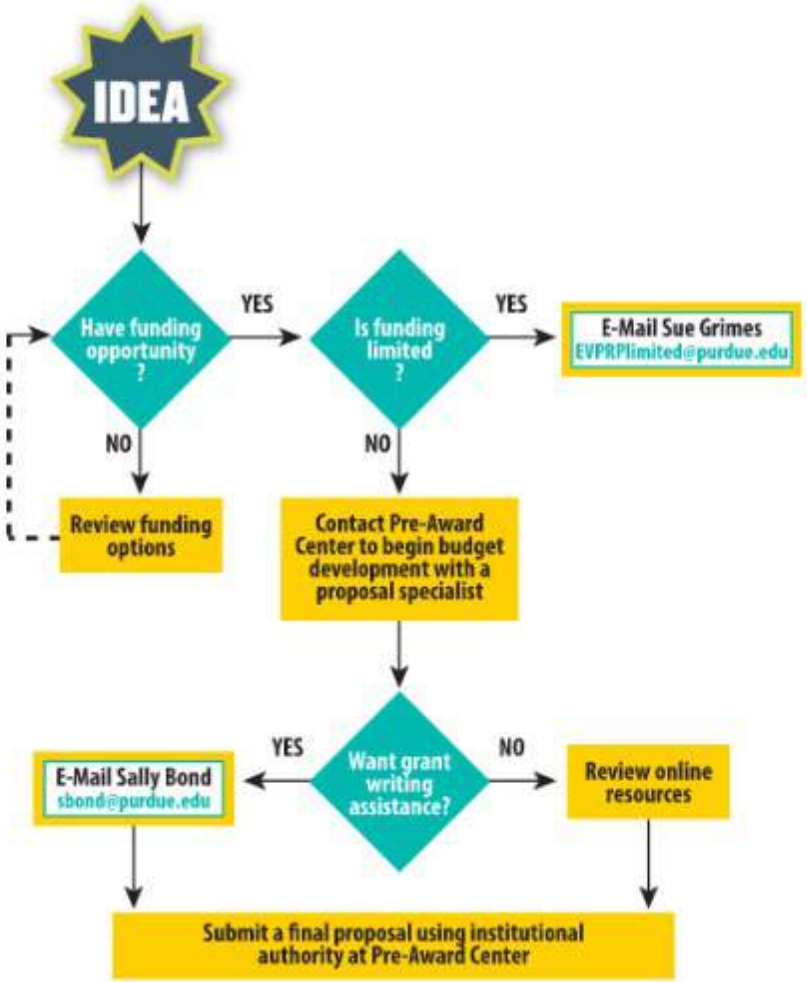
Getting Starting: Quick Overview

- Overview
- Getting Started
- Storyline Strategy
- Request Grant Writing Help
- Boilerplate Text
- Data Management Plans
- Biomedical Research Development
- Self-Help Tools
- Broader Impacts
- Agency Resources

A Visual Guide to the Grants Process at Purdue

Where are you in the process?

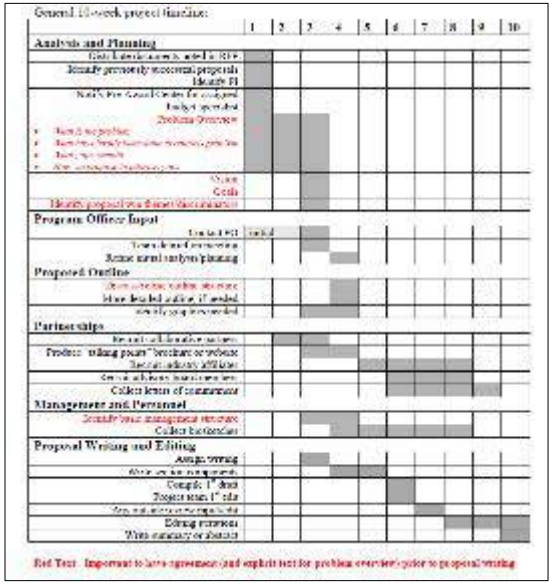
Click on each flowchart box to find more information.



Ask for Grant Writing Help

- Any award size
- Any agency
- External proposals only
- When? Sooner is better
- Concept storylines to shop your idea

Ask for Grant Writing Help



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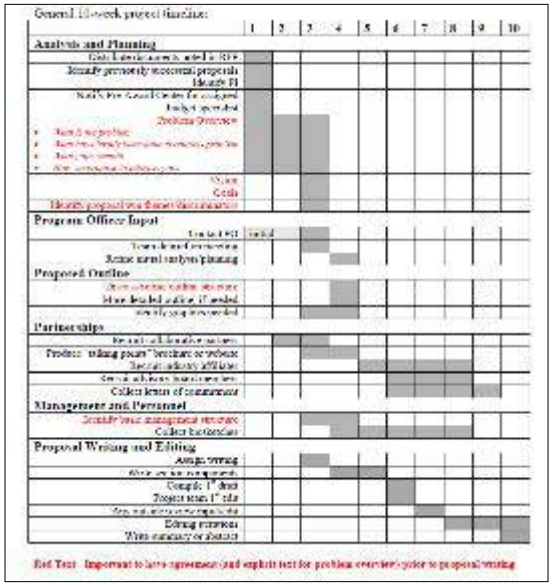
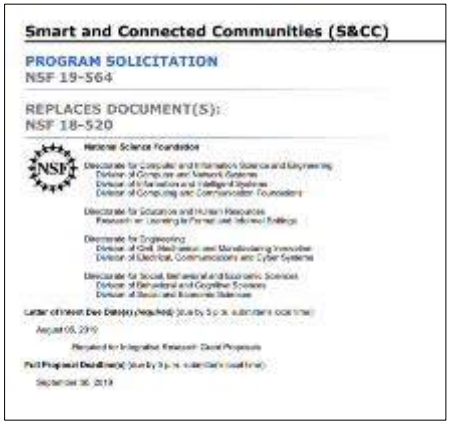
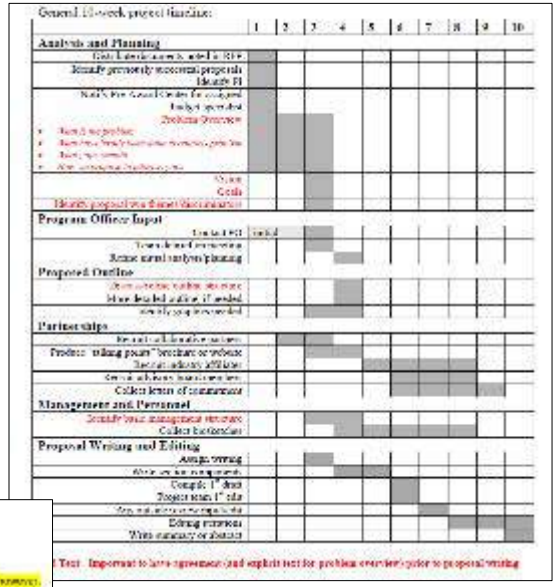


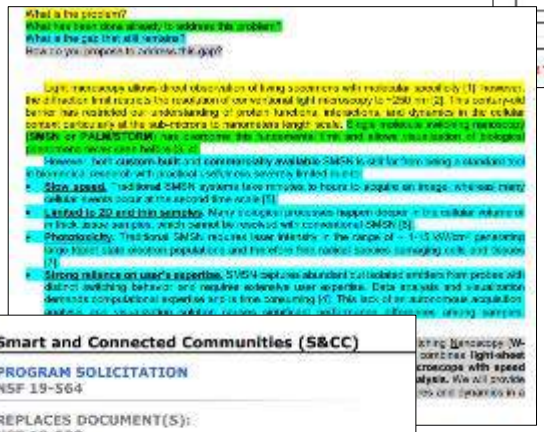

Smart and Connected Communities (S&CC)

PROGRAM SOLICITATION
NSF 19-564

REPLACES DOCUMENT(S):
NSF 18-520

Ask for Grant Writing Help





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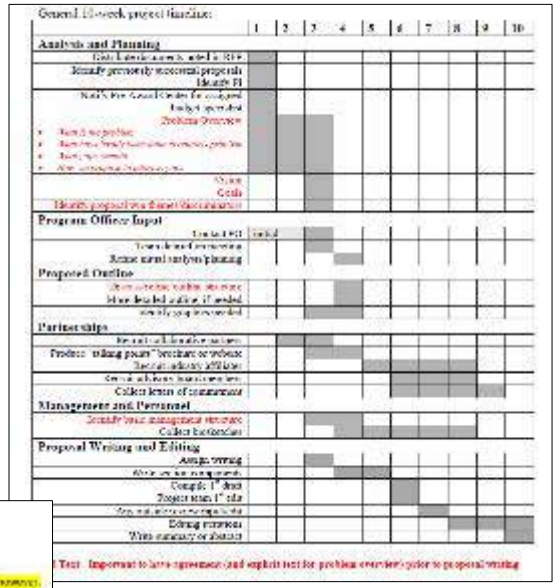

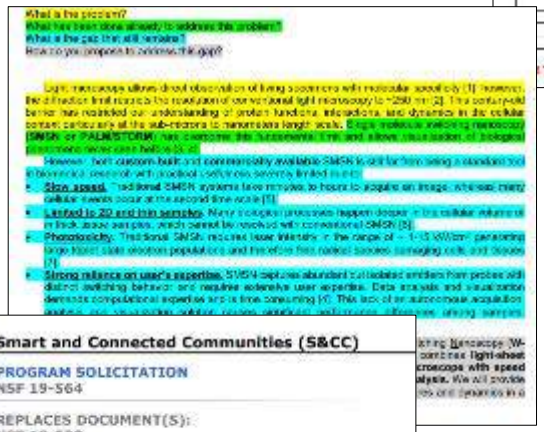

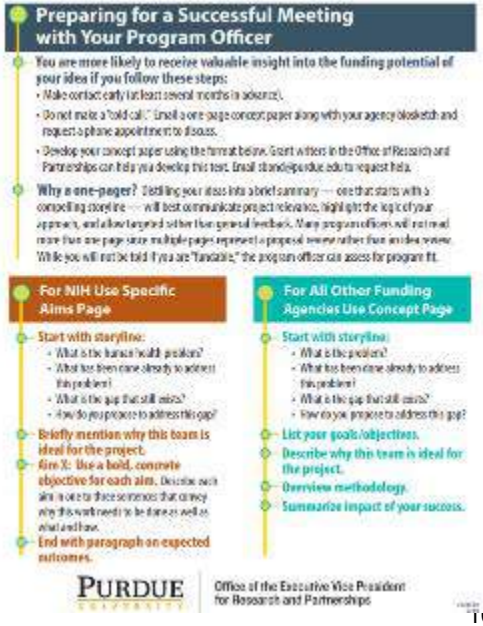

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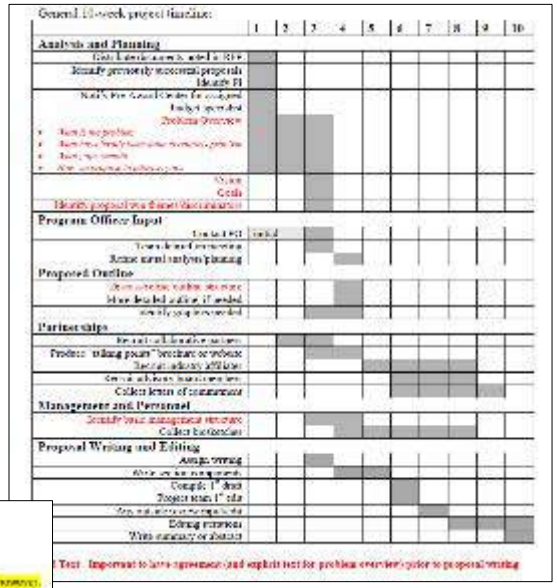

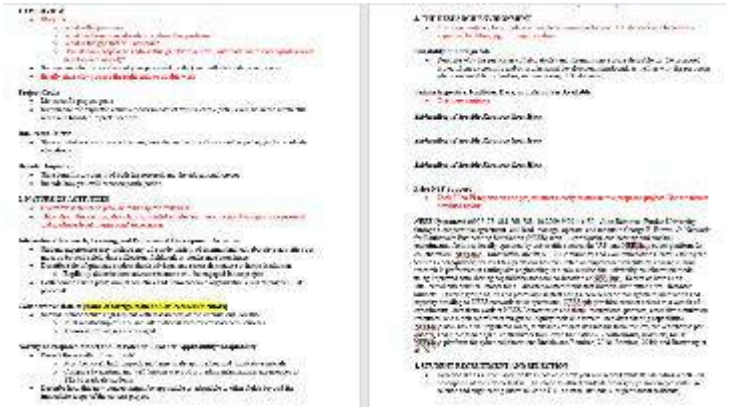

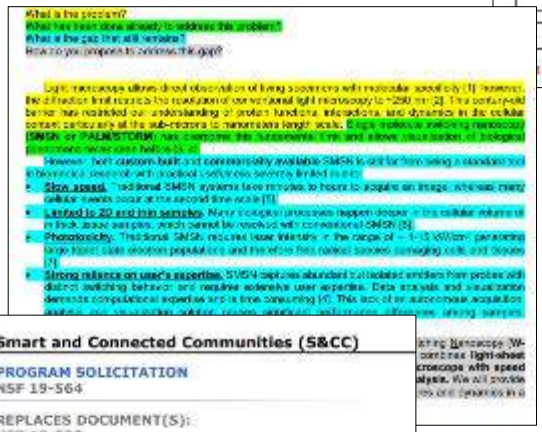

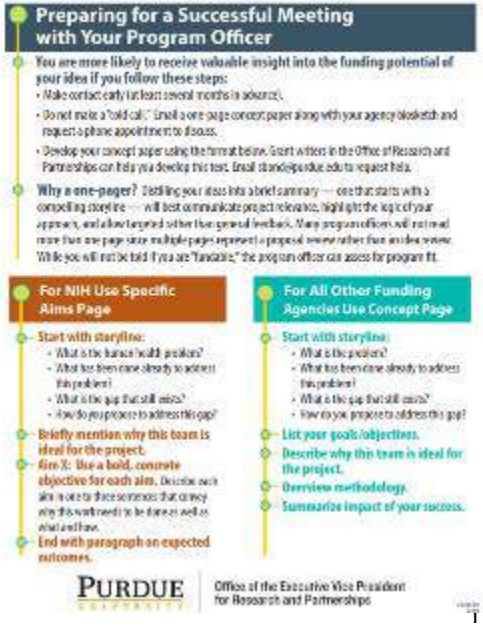

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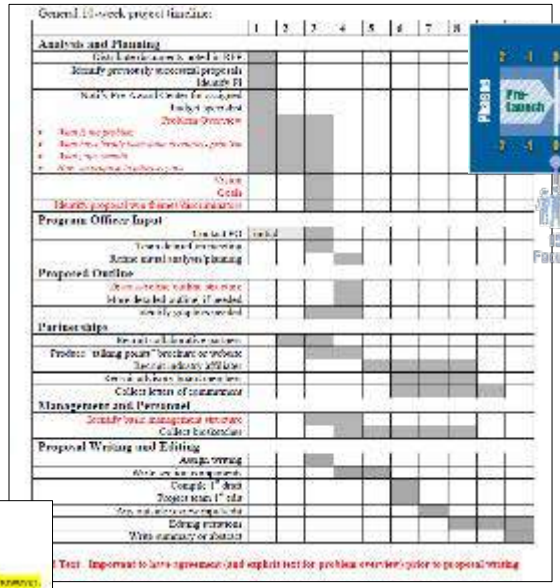

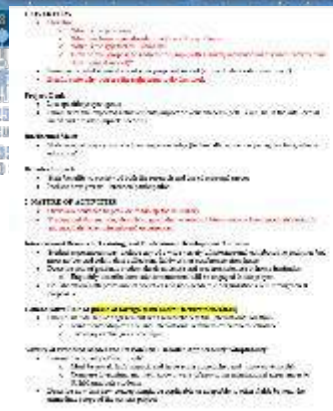

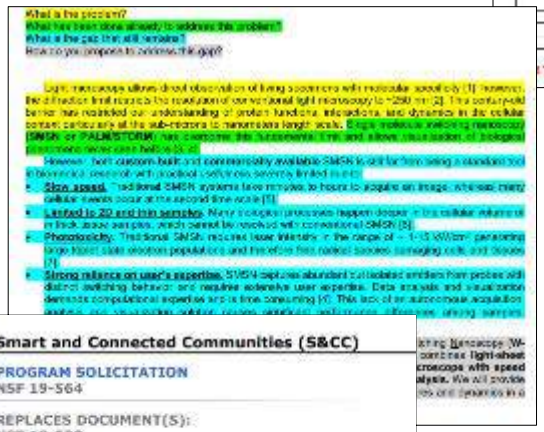

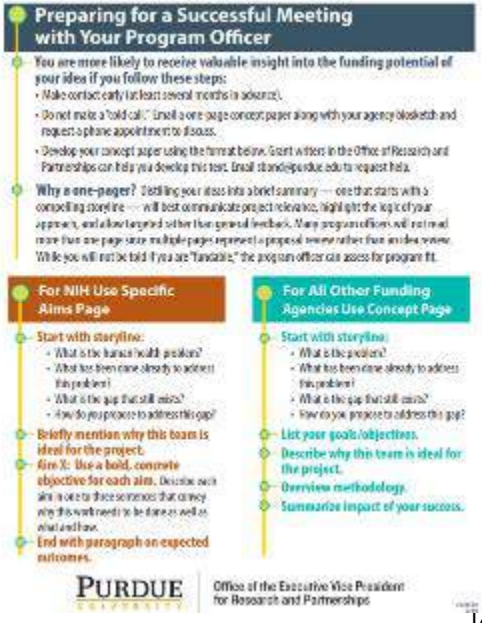

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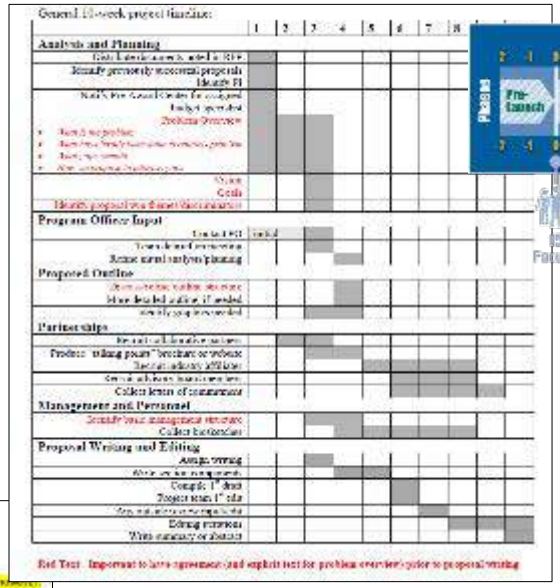

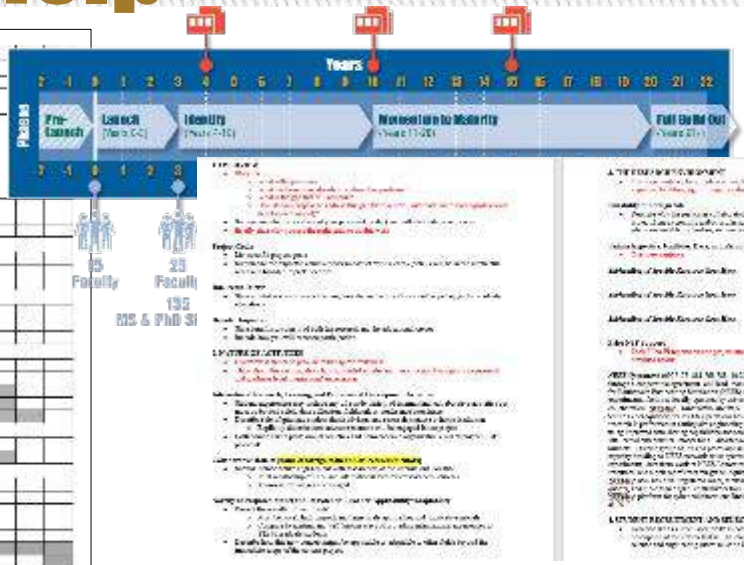

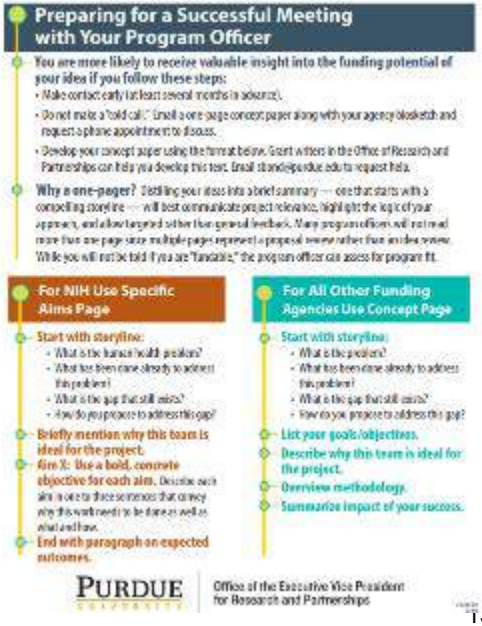

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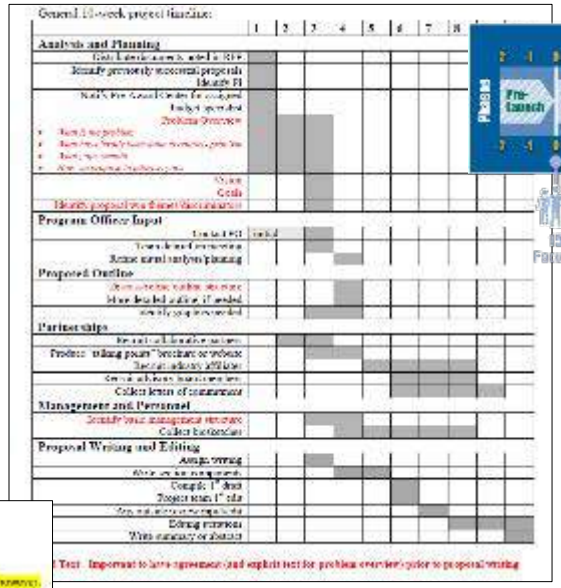

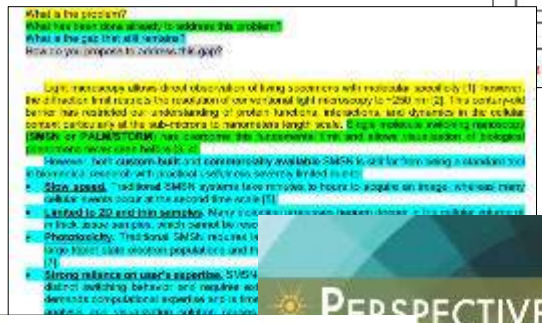

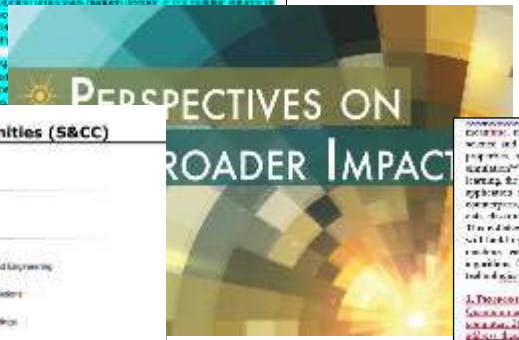

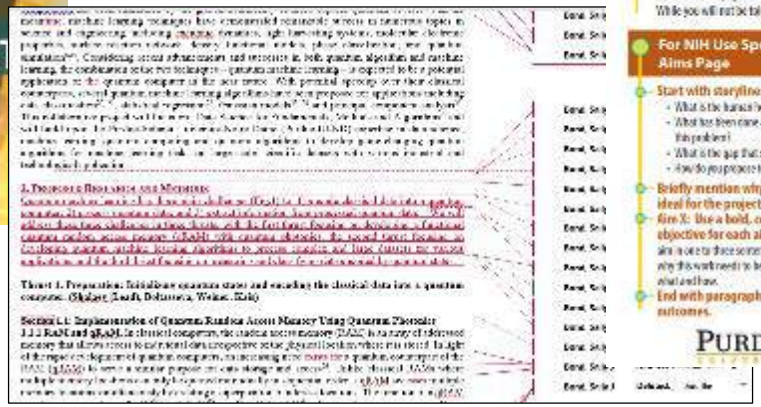

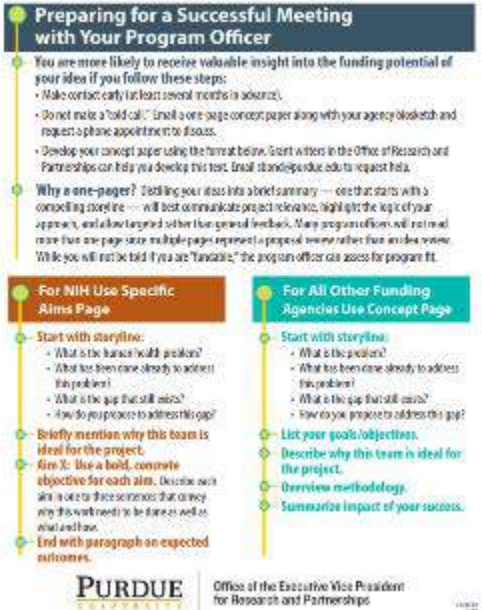

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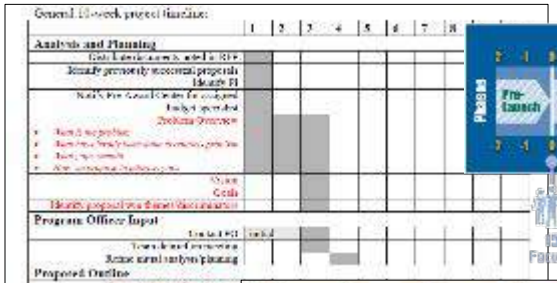

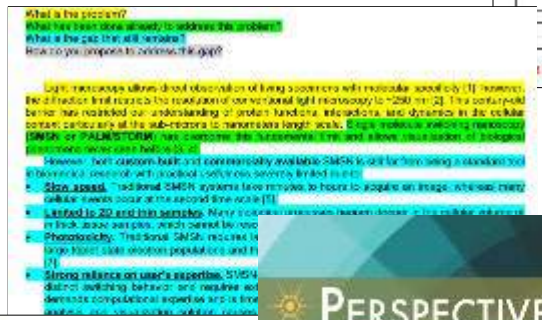

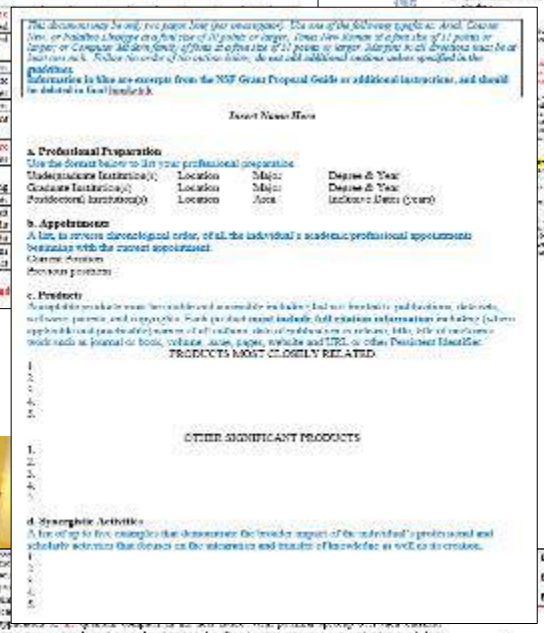

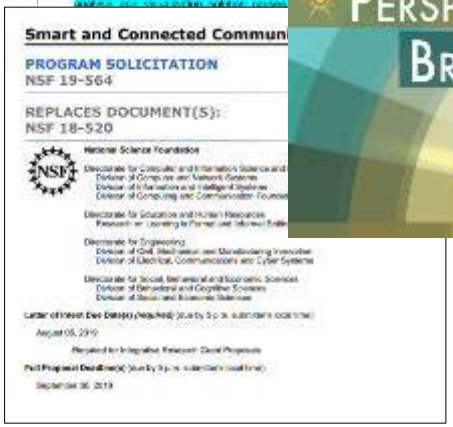

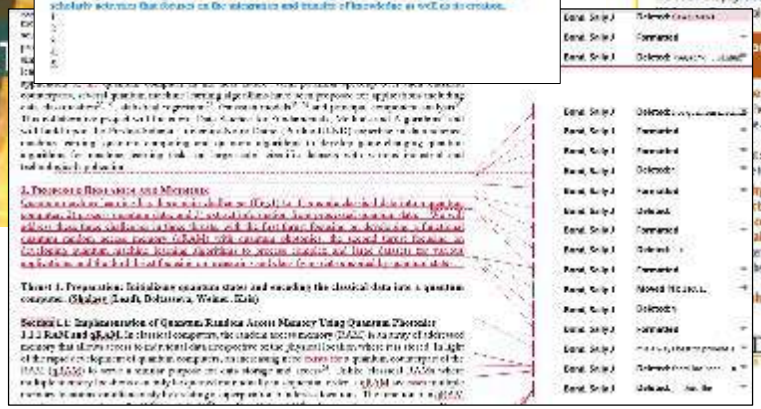

Proposal Preparation Process

Tailored and intentional plan

General 10-week project timeline:

	1	2	3	4	5	6	7	8	9	10
Analysis and Planning										
Distribute documents noted in RFP										
Identify previously successful proposals										
Identify PI										
Notify Pre-Award Center for assigned budget specialist										
Problem Overview • *What is the problem* • *What has already been done to address problem* • *What gaps remain* • *How we propose to address gaps*										
Vision										
Goals										
Identify proposal win themes/discriminators										
Program Officer Input										
Contact PO	mutual									
Team debrief on meeting										
Refine mutual analysis/planning										
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										

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

Key Strategies

Strategies for the strongest proposal submission

- tell a compelling story
- respond to solicitation
- answer “Why Purdue?”
- know your reviewer
- conduct internal review

Build the Storyline

Storyline first!

General 10-week project timeline:

	1	2	3	4	5	6	7	8	9	10
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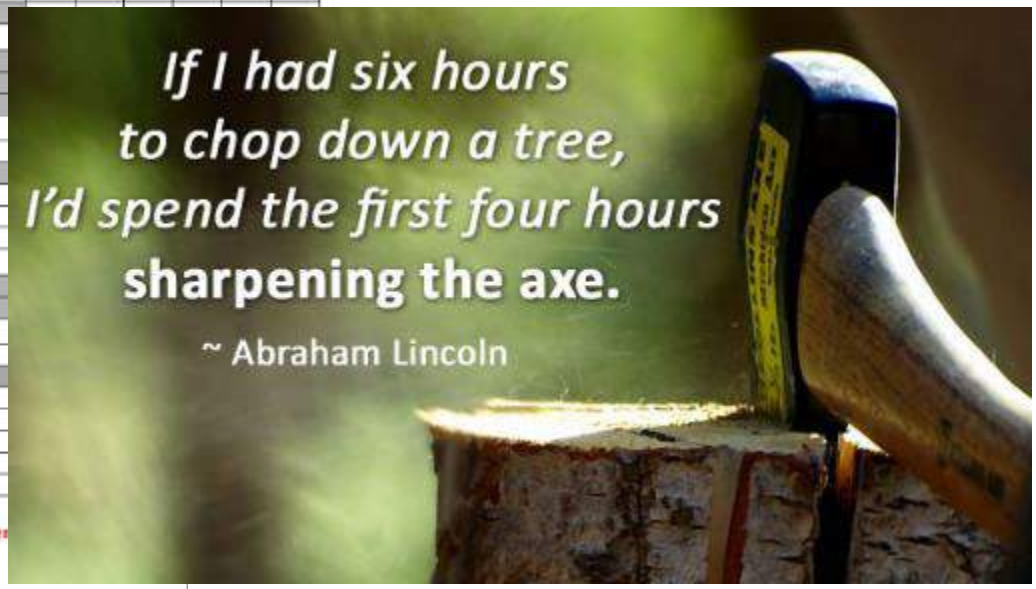


Build the Storyline

Gap analysis

- tell a compelling story
- respond to solicitation
- answer
- know y
- conduc

Good science is a story that…
- begins with a problem
- provides coherence in narrative
- hooks reviewer so weaknesses are not fatal
- sets “north star”

Build the Storyline

Four key questions

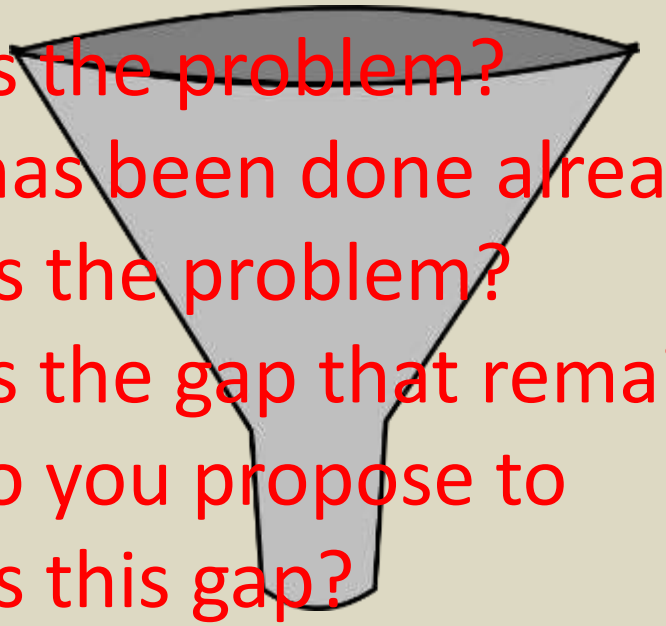
- tell a compelling story
- respond t… li… it…
- answe…
- know …
- condu…

- 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?

Build the Storyline

Funnel of logic flow

- tell a compelling story
- respond t… li… it… ti…
- answe…
- know …
- condu…



Build the Storyline

Example narrative for NIH

Carolina Wählby of the Broad Institute
http://www.niaid.nih.gov/researchfunding/grant/pages/appsamples.aspx

A Significance

The NIH is committed to translating basic biomedical research into clinical practice and thereby impacting global human health[1], and Francis Collins identifies high-throughput technology as one of five areas of focus for the NIH's research agenda[2]. For many diseases, researchers have identified successful novel therapeutics or research probes by applying technical advances in automation to high-throughput screening (HTS) using either biochemical or cell-based assays[3–6]. Researchers are using genetic perturbations such as RNA interference or gene overexpression in cell-based HTS assays to identify genetic regulators of disease processes as potential drug targets[7–9]. However, the molecular mechanisms of many diseases that deeply impact human health worldwide are not well-understood and thus cannot yet be reduced to biochemical or cell-based assays.

Ideally, researchers could approach disease from a phenotypic direction, in addition to the traditional molecular approach, by searching for chemical or genetic regulators of disease processes in whole model organisms rather than isolated cells or proteins. Moving HTS towards more intact, physiological systems also improves the likelihood that the findings from such experiments accurately translate into the context of the human body (e.g., in terms of toxicity and bioavailability), simplifying the path to clinical trials and reducing the failure of potential therapeutics at later stages of testing. In fact, for some diseases, a whole organism screen may actually be necessary to break new therapeutic ground; in the search for novel therapeutics for infectious agents, for example, it is widely speculated that the traditional approach of screening for chemicals that directly kill bacteria *in vitro* has been largely exhausted[10]. Our work recently identified six novel classes of chemicals that cure model organisms from infection by the important human pathogen *E. faecalis* through mechanisms distinct from directly killing the bacterium itself[11]. Anti-infectives with new mechanisms of action are urgently needed to combat widespread antibiotic resistance in pathogens.

Enabling HTS in whole organisms is therefore recognized as a high priority (NIH PAR-08-024)[12,13]. *C. elegans* is a natural choice. Manually-analyzed RNAi and chemical screens are well-proven in this organism, with dozens completed[14–16]. Many existing assays can be adapted to HTS; instrumentation exists to handle and culture *C. elegans* in HTS-compatible multi-well. Its organ systems have high physiologic similarity and genetic conservation with humans[17,18]. *C. elegans* is particularly suited to assays involving visual phenotypes: physiologic abnormalities and fluorescent markers are easily observed because the worm is mostly transparent. The worms follow a stereotypic development pattern that yields identically-appearing adults[19,20], such that deviations from wild-type are more readily apparent.

The bottleneck that remains for tackling important human health problems using *C. elegans* HTS is image analysis (NIH PA-07-320)[21,22]. It has been recently stated, "Currently, one of the biggest technical limitations for large-scale RNAi-based screens in *C. elegans* is the lack of efficient high-throughput methods to quantitate lethality, growth rates, and other morphological phenotypes"[23]. **Our proposal to develop image analysis algorithms to identify regulators of infection and metabolism in high-throughput *C. elegans* assays would bring image-based HTS to whole organisms, and have the following impact:**

Storyline to Concept Paper

Preparing for a Successful Meeting with Your Program Officer

You are more likely to receive valuable insight into the funding potential of your idea if you follow these steps:

- Make contact early (at least several months in advance).
- Do not make a "cold call." Email a one-page concept paper along with your agency biosketch and request a phone appointment to discuss.
- Develop your concept paper using the format below. Grant writers in the Office of Research and Partnerships can help you develop this text. Email sbond@purdue.edu to request help.

Why a one-pager? Distilling your ideas into a brief summary — one that starts with a compelling storyline — will best communicate project relevance, highlight the logic of your approach, and allow targeted rather than general feedback. Many program officers will not read more than one page since multiple pages represent a proposal review rather than an idea review. While you will not be told if you are "fundable," the program officer can assess for program fit.

For NIH Use Specific Aims Page

Start with storyline:

- What is the human health problem?
- What has been done already to address this problem?
- What is the gap that still exists?
- How do you propose to address this gap?

Briefly mention why this team is ideal for the project.

Aim X: Use a bold, concrete objective for each aim. Describe each aim in one to three sentences that convey why this work needs to be done as well as what and how.

End with paragraph on expected outcomes.

For All Other Funding Agencies Use Concept Page

Start with storyline:

- What is the problem?
- What has been done already to address this problem?
- What is the gap that still exists?
- How do you propose to address this gap?

List your goals/objectives.

Describe why this team is ideal for the project.

Overview methodology.

Summarize impact of your success.

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Build the Storyline

One-page…taste of your entire grant in a single, bite-sized piece

It forces you to distill all aspects down to their essences and to find a way of piecing things together that is economical, coherent, logical, and compelling […] is totally unforgiving, revealing problems in the clarity of your thinking and presentation, weaknesses in the logic of your research, vagueness in your methods, and failures in the all-important 'so what?' realm. Given the luxury of length, additional verbiage has a way of camouflaging weaknesses (at least from the writer but not so often from the reviewer).

—Robert Levenson, UC-Berkeley

Key Strategies

Addressing common trouble spots

- tell a compelling story
- respond to solicitation
- answer "W
- know you
- conduct internal review

  - follow all instructions!
  - outline before writing

Respond to Solicitation

Know the agency guidelines as well as solicitation

Environmental Convergence Opportunities in Chemical, Bioengineering, Environmental, and Transport Systems (ECO-CBET)

PROGRAM SOLICITATION
NSF 21-596

REPLACES DOCUMENT(S):
NSF 21-527

National Science Foundation
Directorate for Engineering
Division of Chemical, Bioengineering, Environmental and Transport Systems

Preliminary Proposal Due Date(s) (required) (due by 5 p.m. submitter's local time):

October 01, 2021

September 19, 2022

September 17, Annually Thereafter

Preliminary Proposal Deadline Date

Full Proposal Deadline(s) (due by 5 p.m. submitter's local time):

January 31, 2022

January 31, Annually Thereafter

Full Proposal Deadline Date

IMPORTANT INFORMATION AND REVISION NOTES

Revisions to the solicitation include:

- The preliminary proposal and full proposal deadlines have been changed from that defined in NSF 21-527.
- The priority research areas have been updated to reflect current scientific needs and Division priorities.
- Proposal preparation and submission instructions have been updated for added clarity.

Preliminary Proposals submitted in response to the October 1, 2021 deadline should be submitted in accordance with the NSF Proposal & Award Policies & Procedures Guide (PAPPG) (NSF 20-1), which is effective for proposals submitted, or due, on or after June 1, 2020.

Full Proposals submitted in response to this solicitation should be submitted in accordance with the revised PAPPG (NSF 22-1), which is effective for proposals submitted, or due, on or after October 4, 2021.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Environmental Convergence Opportunities in Chemical, Bioengineering, Environmental, and Transport Systems (ECO-CBET)

Synopsis of Program:

Creating effective solutions to our most pressing environmental and sustainability challenges requires imaginative thinking - the kind that evolves when researchers from disparate fields, expertise, or perspectives fully immerse themselves in work toward a common goal. The National Academies of Sciences, Engineering and Medicine (NASEM), in their report "Environmental Engineering for the 21st Century: Addressing Grand Challenges," identified five critical challenges we must address as a society: sustainably supply food, water, and energy; curb climate change and adapt to its impacts; design a future without pollution and waste; create efficient, healthy, and resilient cities; and

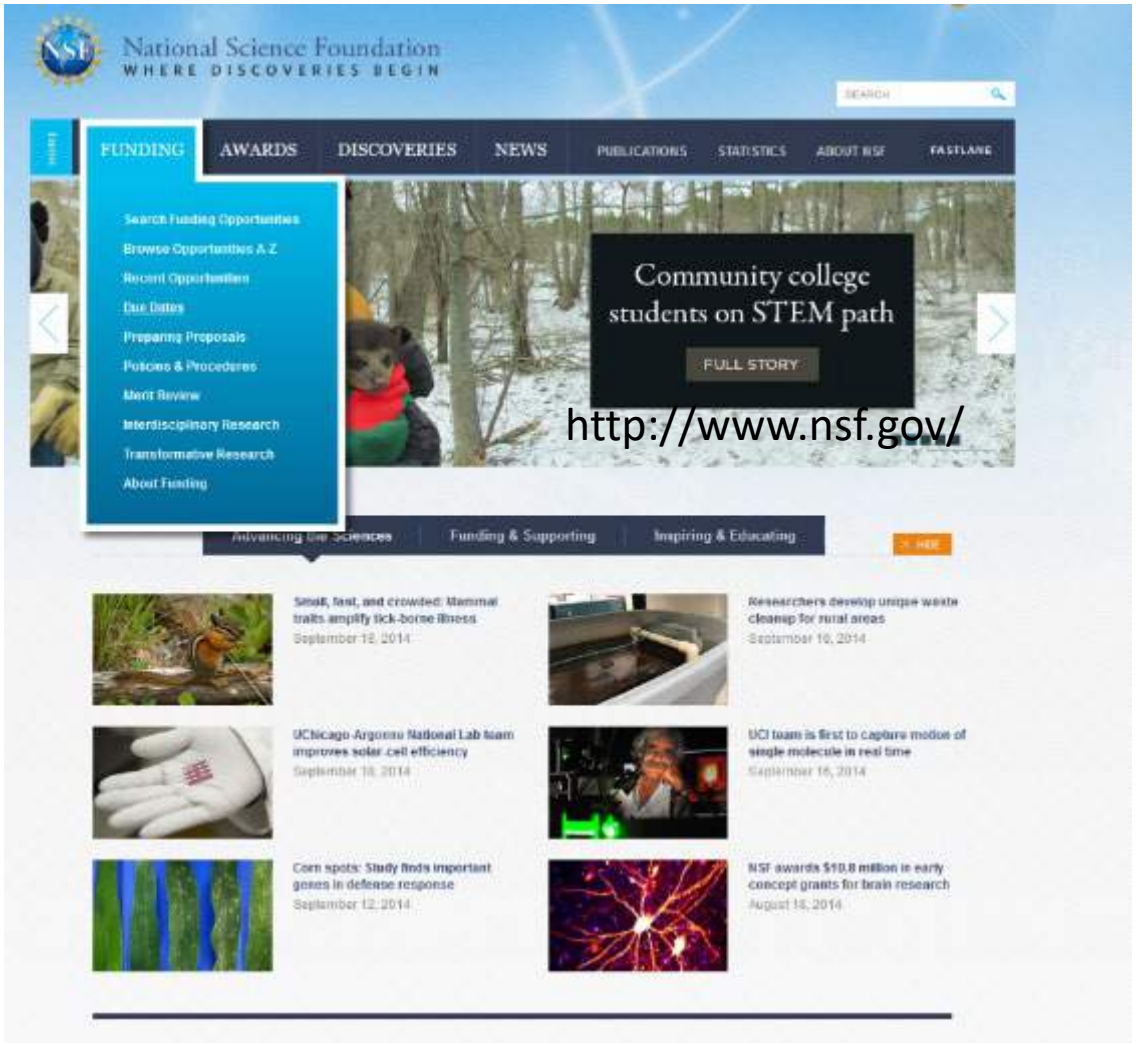
Respond to Solicitation

Sleuth what was funded previously to identify trends

- What type of science and how does it compare to yours?
- What was team composition?
- What type of education integration?
- What type of institution?
- What type of budget?

Respond to Solicitation

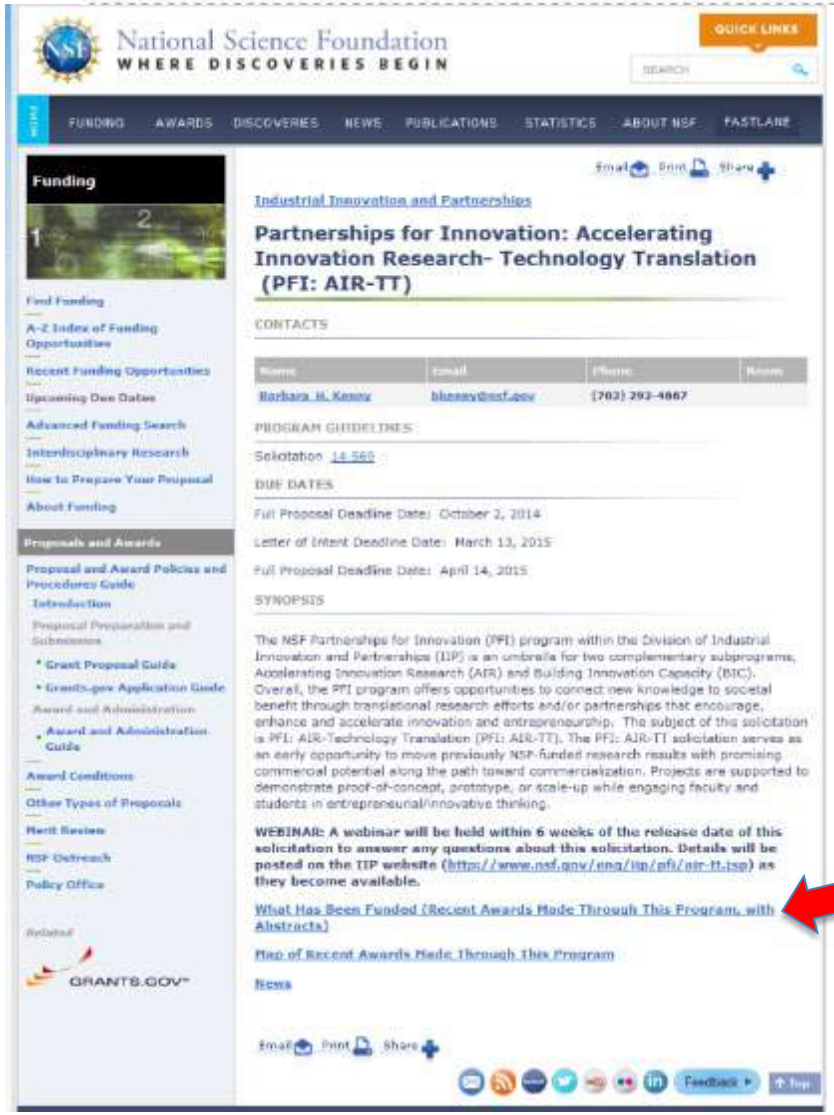
Agency websites often show what was previously funded.



www.nsf.gov

Respond to Solicitation

Each program page has "what has been funded" and map of recent awards.



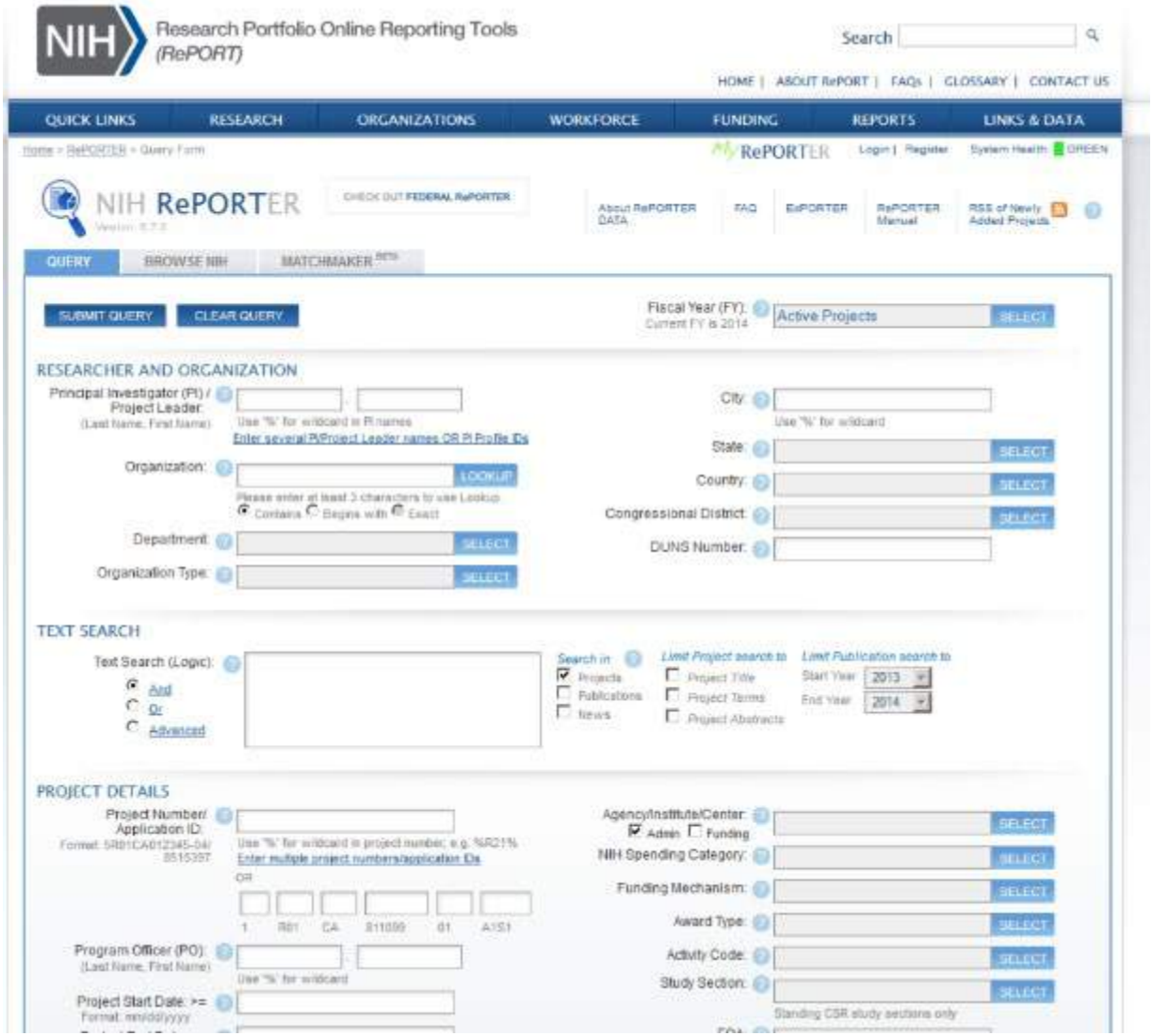
[What Has Been Funded (Recent Awards Made Through This Program, with Abstracts)]

[Map of Recent Awards Made Through This Program]

[News]

Respond to Solicitation

NIH RePORTer http://projectreporter.nih.gov/reporter.cfm.



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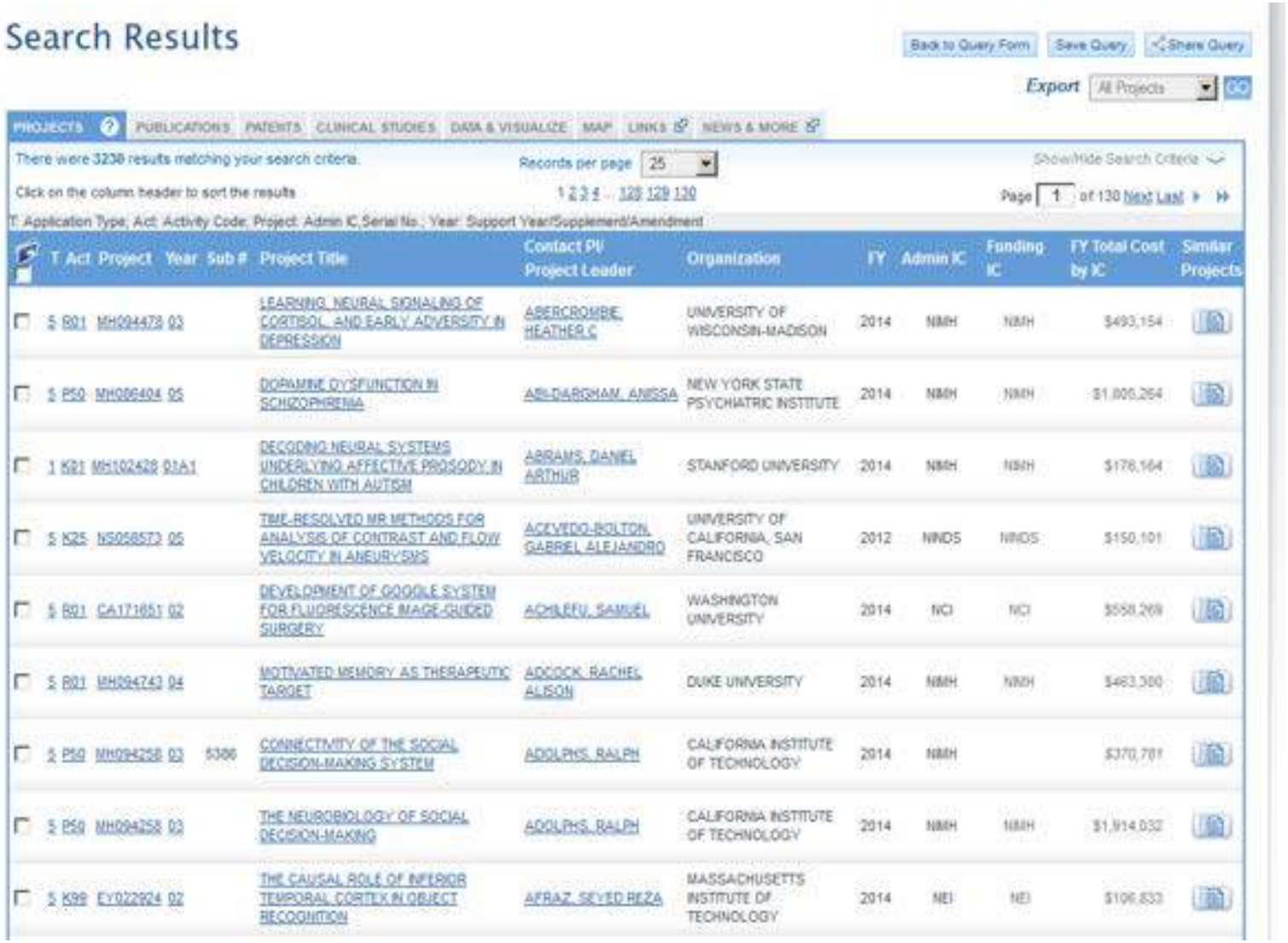

Search Results

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There were 3230 results matching your search criteria. Records per page: 25 — Show/Hide Search Criteria

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T: Application Type; Act: Activity Code; Project: Admin IC,Serial No.; Year: Support Year/Supplement/Amendment

	T	Act	Project	Year	Sub #	Project Title	Contact PI/ Project Leader	Organization	FY	Admin IC	Funding IC	FY Total Cost by IC	Similar Projects
☐	5	R01	MH094478	03		LEARNING, NEURAL SIGNALING OF CORTISOL, AND EARLY ADVERSITY IN DEPRESSION	ABERCROMBIE, HEATHER C	UNIVERSITY OF WISCONSIN-MADISON	2014	NIMH	NIMH	$493,154	
☐	5	P50	MH086404	05		DOPAMINE DYSFUNCTION IN SCHIZOPHRENIA	ABI-DARGHAM, ANISSA	NEW YORK STATE PSYCHIATRIC INSTITUTE	2014	NIMH	NIMH	$1,605,264	
☐	1	K01	MH102428	01A1		DECODING NEURAL SYSTEMS UNDERLYING AFFECTIVE PROSODY IN CHILDREN WITH AUTISM	ABRAMS, DANIEL ARTHUR	STANFORD UNIVERSITY	2014	NIMH	NIMH	$176,164	
☐	5	K25	NS058573	05		TIME-RESOLVED MR METHODS FOR ANALYSIS OF CONTRAST AND FLOW VELOCITY IN ANEURYSMS	ACEVEDO-BOLTON, GABRIEL ALEJANDRO	UNIVERSITY OF CALIFORNIA, SAN FRANCISCO	2012	NINDS	NINDS	$150,101	
☐	5	R01	CA171651	02		DEVELOPMENT OF GOOGLE SYSTEM FOR FLUORESCENCE IMAGE-GUIDED SURGERY	ACHILEFU, SAMUEL	WASHINGTON UNIVERSITY	2014	NCI	NCI	$558,269	
☐	5	R01	MH094743	04		MOTIVATED MEMORY AS THERAPEUTIC TARGET	ADCOCK, RACHEL ALISON	DUKE UNIVERSITY	2014	NIMH	NIMH	$483,300	
☐	5	P50	MH094258	03	5386	CONNECTIVITY OF THE SOCIAL DECISION-MAKING SYSTEM	ADOLPHS, RALPH	CALIFORNIA INSTITUTE OF TECHNOLOGY	2014	NIMH		$370,781	
☐	5	P50	MH094258	03		THE NEUROBIOLOGY OF SOCIAL DECISION-MAKING	ADOLPHS, RALPH	CALIFORNIA INSTITUTE OF TECHNOLOGY	2014	NIMH	NIMH	$1,914,032	
☐	5	K99	EY022924	02		THE CAUSAL ROLE OF INFERIOR TEMPORAL CORTEX IN OBJECT RECOGNITION	AFRAZ, SEYED REZA	MASSACHUSETTS INSTITUTE OF TECHNOLOGY	2014	NEI	NEI	$196,833	

Respond to Solicitation

Outline before you write. Be consistent with formatting.

Example of NSF-style proposal outline

1. RATIONALE **[2.5 pages]**
   - Storyline
     - What is the problem?
     - What has been done already?
     - What is the gap that still remains?
     - What do you propose to do to address this gap?

Goals and Objectives
- List goals and objectives (per goal)

Team Partnership
- Team expertise
- Targeted teacher and/or community college faculty participants
- Institutional commitment

Broader Impacts
- curriculum accessed by underrepresented students through targeted teacher recruitment
- community-based research activities
- integrating research activities into computing-related courses in local high schools
- role models from HCBU partner on HUBzone webinars
- presentation to parent-teacher organizations to include assessment results from DLRC-collected metrics
- presentations at both technology education conferences as well as K-12 STEM learning

2. NATURE OF TEACHER ACTIVITIES **[3.5 pages]**
   - Need clearly articulated research projects and activities
     - Map to goals/objectives
   - Teachers must be involved in research project for at least 6 weeks
   - Must have orientation session at beginning of the program for the teachers to acquaint them with laboratory methods, safety procedures, analytical methods, etc.
   - Address approach to research training being undertaken

Research Project
- Include overview statement of spectrum of research projects

Project 1
- Provide detailed descriptions of examples of research projects
  - Include who is doing what role
- Present plans that will ensure the development of RET participant-faculty interaction and communication
- How will you facilitate development of collegial relationships and interactions as teachers work closely in teams with university faculty and students?

Project 2
- Provide detailed descriptions of examples of research projects
  - Include who is doing what role
- Present plans that will ensure the development of RET participant-faculty interaction and communication
- How will you facilitate development of collegial relationships and interactions as teachers work closely in teams with university faculty and students?

Project Timetable
- Need Gantt-style chart such as this
- Overview sentence

Program Initiatives	Year one	Year Two	Year Three	Year Four	Year Five
CICAWEST Administration					
Advisory Board Meeting					
DRI Team and COD meeting					
Mentoring Academy					
Training of teacher chefs					
Mentoring pairs					
Departmental Transformation					
Diversity Forums					
Classic Logic Study @ PC					
Ad Hoc Initiatives					
Transformation Team Visits					
DCWH Visiting Committees					
Presidents and Deans Retreats					
Building Networks					
Summer					
Invited Lectures					
Evaluation and Assessment					
STEM Climate Assessment					
Space Resource Inventory					
Coaching Measures					
Mentor Networking and Support					
Articulation Surveys					
Deans and Heads					
Faculty					
Network Analysis					
External Project Analysis					
Dissemination					
Website					
CIC Women in Academia					
Annual Attendees Meeting					
Publications					
Particular Presentations					

3. RESEARCH ENVIRONMENT **[2.5 pages]**
   - Describe the experience and record of involvement with K-12/community college education and research of the PI
   - Describe faculty who may serve as research mentors. Consider table such as

Mentor Name	Dept/School	Expertise

   - Describe institution
     - Include emphasis on cross-disciplinary partnership and past record of success in cross-disciplinary collaborations

Key Strategies

Addressing common trouble spots

- tell a compelling story
- respond to solicitation
- answer "Why Purdue?"
- know yo
- conduct

- win differentiators of expertise, facilities, prior work, campus environment

Key Strategies

Addressing common trouble spots

- tell a compelli
- respond to soli
- answer "Why P
- know your reviewer
- conduct internal review

- writing for expert and non-expert
- busy, rushed
- did not choose to read your proposal

Know Your Reviewer

Be kind…you are not writing for yourself.

- use formatting as a roadmap
- be generous with white space
- fix grammar and proof proposal
- write clearly…shorter sentences

Know Your Reviewer

Parallel formatting provides a roadmap to help your reviewer

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Cluster Case Study @ PC					
Ad Hoc Initiatives					
Transformational Team Visits					
SCOD Visiting Committees					
Productivity and Climate Surveys					
Building Networks					
Summit					
Invited Lectures					
Evaluation and Assessment					
STEM Climate Questionnaire					
Space Resource Inventory					
Coaching Measures					
Mentor Network Survey and Report					
Attitudinal Surveys					
Cases and Visits					
Faculty					
Network Analysis					
External Project Analysis					
Dissemination					
Website					
CD: Women in Academia					
Annual Activities Meeting					
Publications					
National Presentations					

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Parallel formatting provides a roadmap to help your reviewer

Research Strategy (usually 12 pages) Option 2 with common preliminary studies

A. Significance
B. Innovation
C. Approach
- Overview sentence on the team and the approach

Preliminary Studies (for all the aims together)
- For all the aims together

Title of Specific Aim #1 (verbatim from your specific aims section)
- Introductory paragraph

Research Design

Expected Outcomes

Potential Problems and Alternative Strategies

Title of Specific Aim #2 (verbatim from your specific aims section)
- Introductory paragraph

Research Design

Expected Outcomes

Potential Problems and Alternative Strategies

Title of Specific Aim #3 (verbatim from your specific aims section)
- Introductory paragraph

Research Design

Expected Outcomes

Potential Problems and Alternative Strategies

Timetable
- Use Gantt chart

Future Directions (optional)

Know Your Reviewer

Avoid dense text by adding white space

Format 1

The NEES collaboration created a total of 15 advanced equipment sites for experimental work dedicated to the reduction of the earthquake threat (Figure 4). The current experimental reach of the equipment ranges from the marine to the geotechnical to the structural environments and can address almost any technical question that may arise on issues related to the safety of the built-environment in earthquakes. Development of this massive array of experimental capabilities demanded an intense and sustained effort. In retrospect, it would appear that the leaders of research groups involved in the creation of the 15 sites were totally absorbed, as they should have been, in the proper development of a magnificent experimental capability across the U.S. Unfortunately, there were three unplanned and unintended results: 1) a negative perception among a portion of the research community that equipment access was not equitable; 2) most, if not all, of the research work initiated has not yet been of a quality to transform the engineering community culture; and 3) the information technology infrastructure, which had initially inspired the NEES concept of a network of interconnected laboratories, has yet to reach its potential. The metaphor of a powerful fleet of battleships at anchor is not irrelevant to the current status. Our goal is to get the fleet moving in harmony.

Rapid advance in engineering knowledge and capability requires at least four ingredients: 1) a driving need; 2) a large community of well-educated professionals; 3) financial support; and 4) competing centers of research and development. As emphasized by the tragic disaster in Wenchuan, PRC, in May 2008, there continues to be a critical need for advances in earthquake-loss reduction. Considering the seismic histories of population centers such as San Francisco, Los Angeles, Katmandu, and Istanbul, there is no basis for expecting the earthquake threat to abate in the foreseeable future. In large measure because of the encouragement of the National Science Foundation since the early 1970's, the U.S. is blessed with an impressively large community of professionals well trained in earthquake engineering and related sciences. The first two ingredients are very much in place. As long as the U.S. continues to have a strong economic profile and maintains its proven ability to plan beyond the immediate future, financial support for research and development in earthquake issues will continue. Our mission, then, is for NEES to take the lead in providing the competing centers of research and development to achieve catalysis of the existing essential ingredients as described below. The seminal idea for the NEES network was the creation of an experimental-research infrastructure with many visions and capabilities at different research centers connected with a single purpose through the opportunity provided by information technology. The objective of creating a successful equipment infrastructure has been achieved. A driving challenge now is to resuscitate what was intended to be the cortex of the system: the information technology (IT) that can enable the required catalysis of ideas.

Our overall strategy is designed to: 1) inspire the NEES researcher to pursue a more ambitious research agenda; 2) entice the rest of the research community to compete for the opportunity to benefit from the sites; 3) encourage academic researchers to interact with the professional engineers in order to accelerate the implementation of new knowledge in practice; and 4) develop a NEES *community* that will include all individuals, institutes, agencies, corporations, professional societies, and non-governmental organizations (NGO) interested in protecting society from the harmful consequences of earthquakes.

A brief look at the history of civilizations will reveal that the nuclear ingredient in their development has been the "agora," or the market. Using the opportunities provided by information technology, we plan to develop the intellectual equivalent of the agora in order to get the "fleet at anchor" moving at an ever-increasing pace. We will employ operational excellence, innovative computational tools, outreach that advances knowledge, and an environment for the catalysis of ideas. Among the qualitative and quantitative performance metrics for measuring our success and developing a compelling basis for continued operation are: 1) the *satisfaction* of users (including both physical and analytical researchers); NEEShub users; and education, outreach and training targets; 2) a *greater diversification* of users, research sponsors, operations sponsors, outreach community, and the NEEShub community; 3) *increased research productivity* in earthquake engineering, including the increased use of NEES equipment by remote users; 4) *greater impact* on codes, technical committees, professional societies, and research directions; and, eventually, 5) *reduced losses* from earthquakes.

Format 2

The NEES collaboration created a total of 15 advanced equipment sites for experimental work dedicated to the reduction of the earthquake threat (Figure 4). The current experimental reach of the equipment ranges from the marine to the geotechnical to the structural environments and can address almost any technical question that may arise on issues related to the safety of the built-environment in earthquakes. Development of this massive array of experimental capabilities demanded an intense and sustained effort. In retrospect, it would appear that the leaders of research groups involved in the creation of the 15 sites were totally absorbed, as they should have been, in the proper development of a magnificent experimental capability across the U.S. Unfortunately, there were three unplanned and unintended results: 1) a negative perception among a portion of the research community that equipment access was not equitable; 2) most, if not all, of the research work initiated has not yet been of a quality to transform the engineering community culture; and 3) the information technology infrastructure, which had initially inspired the NEES concept of a network of interconnected laboratories, has yet to reach its potential. The metaphor of a powerful fleet of battleships at anchor is not irrelevant to the current status. Our goal is to get the fleet moving in harmony.

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Strategic Plan

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Know Your Reviewer

Sloppy writing = sloppy science

Know Your Reviewer

Mechanics matter. Sloppy writing = sloppy science

Elemental mapping of animal tissues has been investigated, and results have been documented.

changed to:

We investigated elemental mapping of animal tissues and documented results.

Know Your Reviewer

Be concise. Less is better.

There are a growing number of scientists who believe the system is capable of addressing user demands.

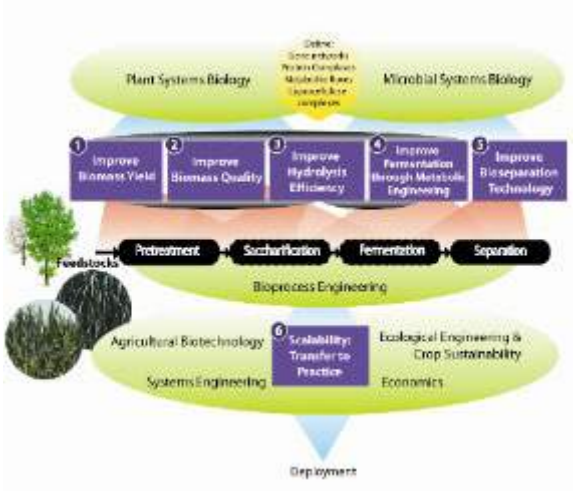
(17 words)

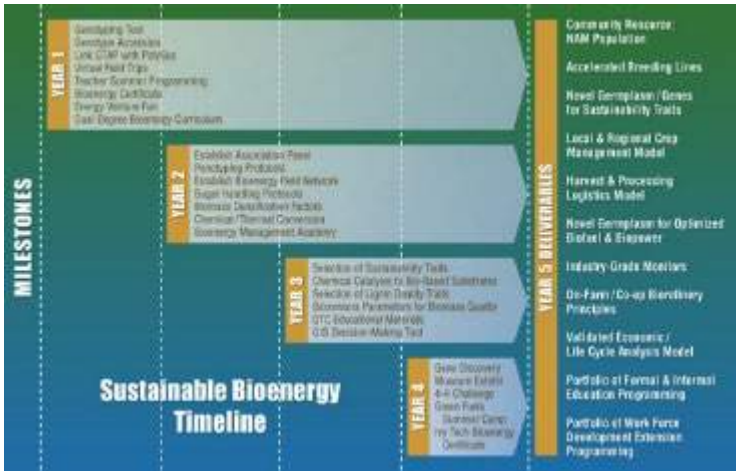
A growing number of scientists believe the system can address user demands.

(12 words)

Know Your Reviewer

Use high-quality, easy-to-read graphics for conceptual and organizational info





Know Your Reviewer

Use visuals to summarize narrative when possible.

Program Initiatives	Year 1	Year 2	Year 3	Year 4	Year 5
Indiana administration					
Membership approved by Executive Council for working committees					
Partner retreat					
Create I-hub					
Create Passport tracking					
External Advisory Board meetings					
Annual Alliance-wide conference					
Goal 1: Alliance-wide practices					
Campus director monthly centralized training					
Augmented training sets					
Faculty/students training on I-hub					
Cross-Alliance recruiting, including veterans					
Goal 2: Effective community college partnership facilitating transfer to four-year STEM programs					
Co-mentored domestic research experience at partner campuses					
Co-mentored international research experience					
Industry guest speakers					
Cross-Alliance teaching symposia and workshops with community college faculty					
Goal 3: Aligning experiences with Tinto's principles of iteration					
Map activities and identify gaps					
Pair scholars with mentors					
Create individualized portfolios					
Map incentives to Passport Badges					
Cross-Alliance international research cohort					
Disseminate model-based best practices					
Goal 4: Research longitudinal model of Scholar development					
Compile a list of Scholar attributes					
Test and validate Scholar attributes					
Collect Scholar data					
Analyze Scholar data and portfolios					
Conduct interviews with Scholars					
Evaluation and Assessment					
Formative site visits					
Formative focus groups/interviews					
Formative web-based surveys					
Formative analysis and reporting					
Summative data plan development					
Summative quantitative data gathering					
Summative analysis and final reporting					

Key Strategies

Addressing common trouble spots

- tell a compelling story
- respond to solicitation
- answer "
- know you
- conduct internal review

- planned from beginning
- formal or informal

Internal Review

New eyes on your draft before submission

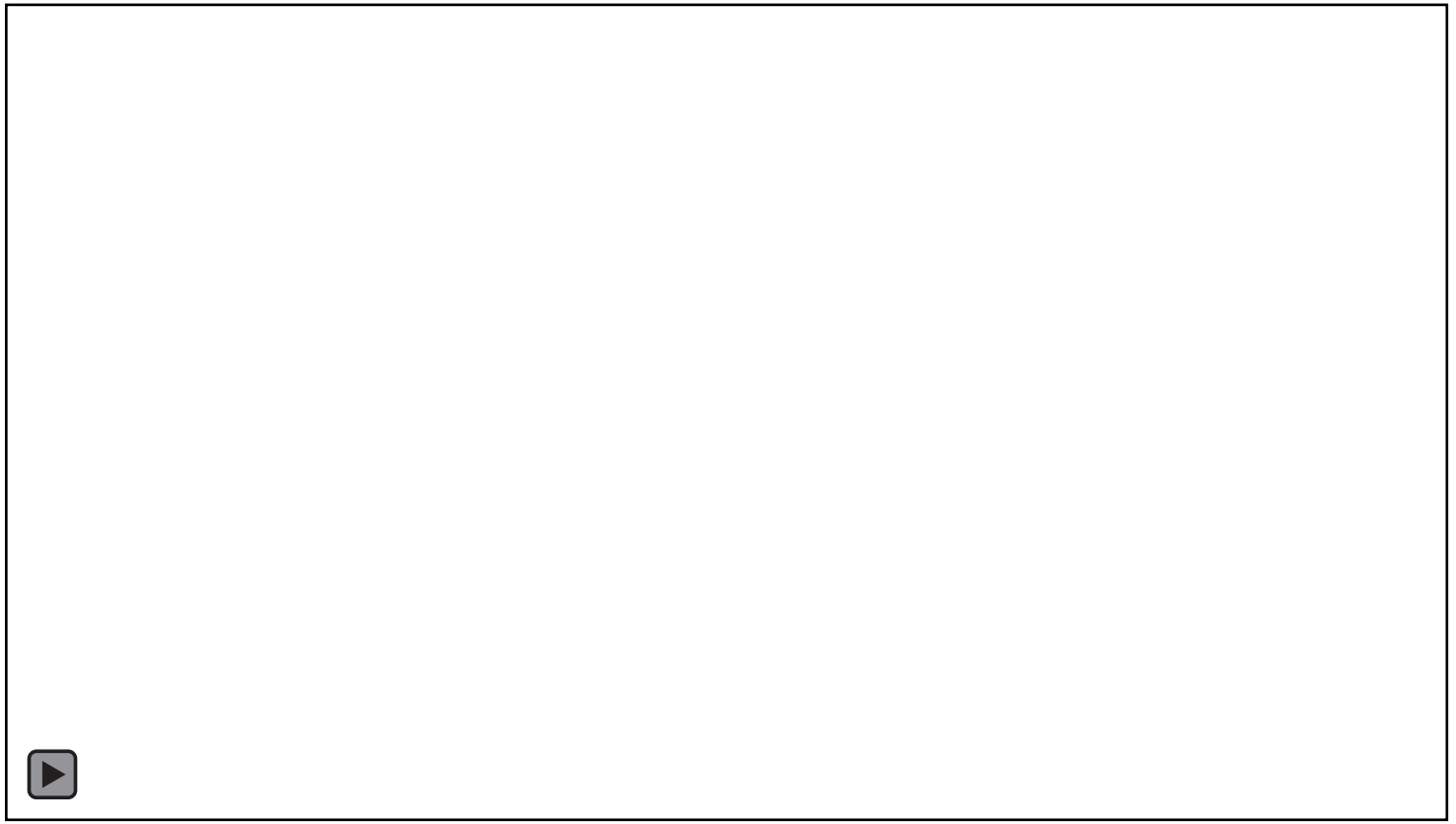
General 10-week project timeline:

	1	2	3	4	5	6	7	8	9	10
Analysis and Planning										
Distribute documents noted in RFP										
Identify previously successful proposals										
Identify PI										
Notify Pre-Award Center for assigned specialist										
Problem Overview • *What is the problem* • *What has already been done to address problem* • *What gaps remain* • *How we propose to address gaps*										
Vision										
Goals										
Identify proposal win themes/discriminators										
Program Officer Input										
Contact PO	initial									
Team debrief on meeting										
Refine initial analysis/planning										
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										

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

Internal Review

Because sometimes what is obvious to you is not obvious to others




GETTING STARTED
STORYLINE STRATEGY
REQUEST A GRANT WRITER
BOILERPLATE TEXT
DATA MANAGEMENT PLANS
BIOMEDICAL RESEARCH DEVELOPMENT
SELF-HELP TOOLS
BROADER IMPACTS
AGENCY RESOURCES

Broader Impacts and Education Plans

What are Broader Impacts?

Broader impacts are the potential to benefit society and contribute to the achievement of specific, desired societal outcomes. They may be accomplished through:

1. the research itself
2. activities directly related to research projects
3. activities supported by and complementary to the project

A broader impact **statement** describes benefits and outcomes—not logistics.

"Cords" of research, education and outreach, and diversity-related activities integrate through your project to deliver **broader impacts.** For instance:

- Fuller Participation of Women, Persons with Disabilities, and Underrepresented Minorities in STEM
- Improved STEM Education and Educator Development
- Increased Public Scientific Literacy
- Improved Well-Being of Individuals
- Development of a Diverse, Globally Competitive Workforce
- Increased Partnerships among Academia, Industry, Government, and Non-Profits
- Improved National Security
- Increased U.S. Economic Competitiveness
- Informed Public Policy
- Enhanced Research and Education Infrastructure

(Coming Soon!)

Example Broader Impact Statements from Funded NSF Proposals

Steps to Develop an Education and Workforce Development Plan

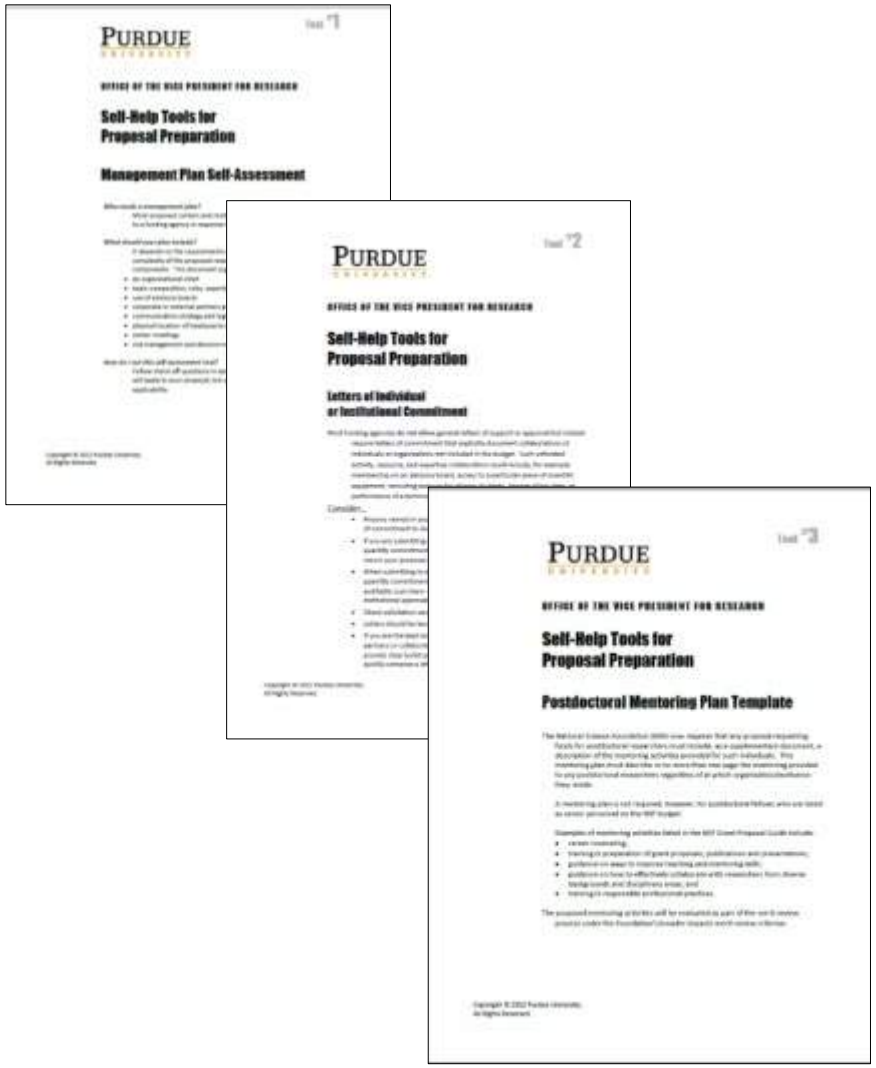
Tips for Broadening Participation and Diversity, Equity, and Inclusion Plans

Other Broader Impact Resources

Request a Broader Impact Consultation

* National Science Foundation *Proposal and Award Policies and Procedures Guide*

Templates and Step-by-Step Guidance



Drop-in Text for Resource/Facilities

Data Management Plans

DMP Development Resources

- **Purdue Libraries Data Management Guidelines**
- **Purdue-Affiliated dmptool.org** for data management plans templates, sample documents, and funder guidance.
- **Purdue's Research Repository (PURR)** contains step-by-step instructions for completing the data management plan requirements and citable boilerplate text that can be inserted into your DMP.
- **Data Storage Options at Purdue** explains different data storage options available to the Purdue community

Sample DMPs from funded Purdue projects

NSF Division of Engineering Education and Centers (CISTAR 2017)

NASA Space Technologies Research Institutes (Dyke 2019)

NSF Division of Behavorial and Cognitive Sciences (Ma 2017)

NSF Division of Research on Learning (Ryu 2018)

Questions?

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