Successful Grant Writing Strategies

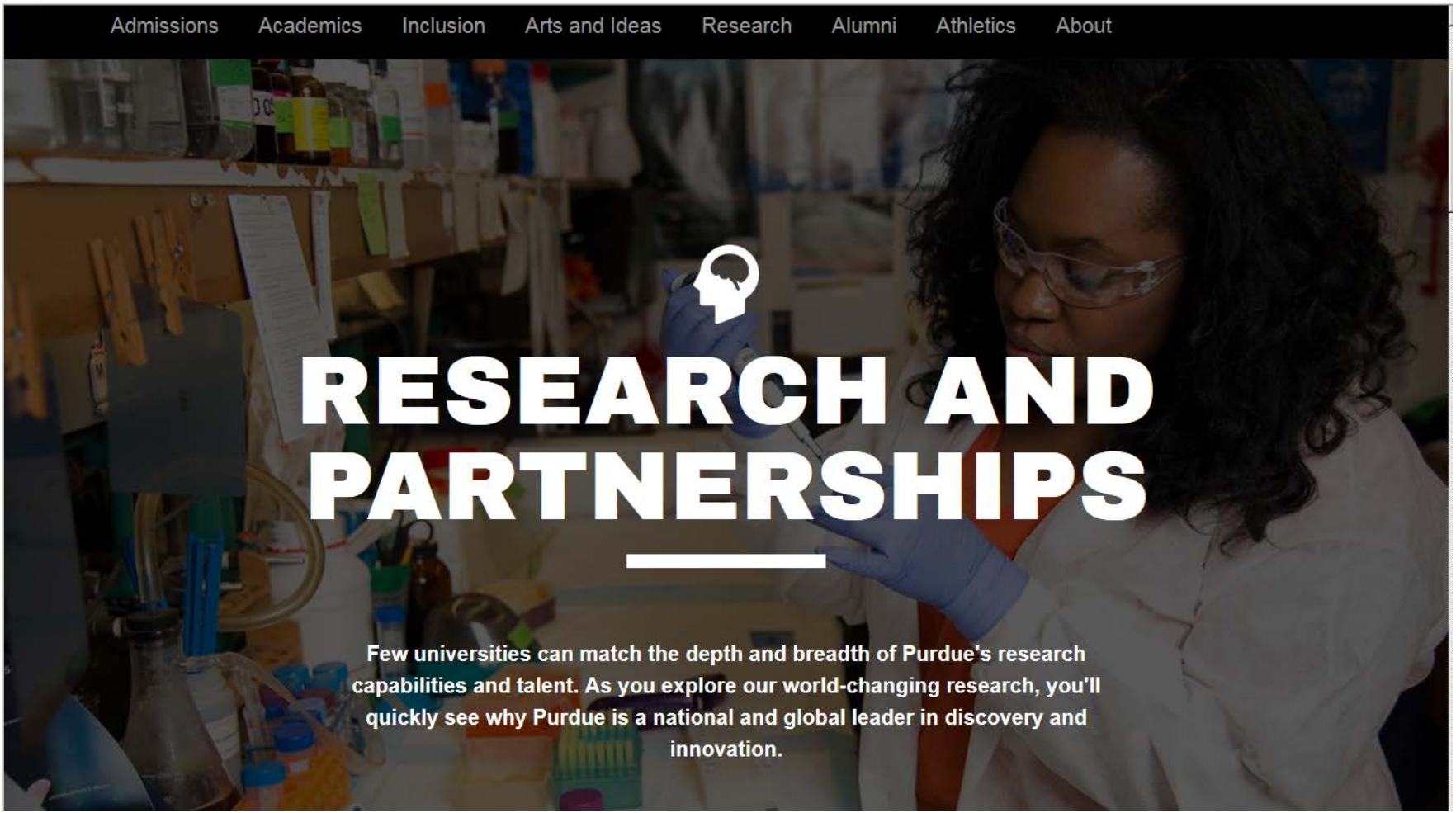
Purdue grant writing strategies and assistance

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

PURDUE UNIVERSITY

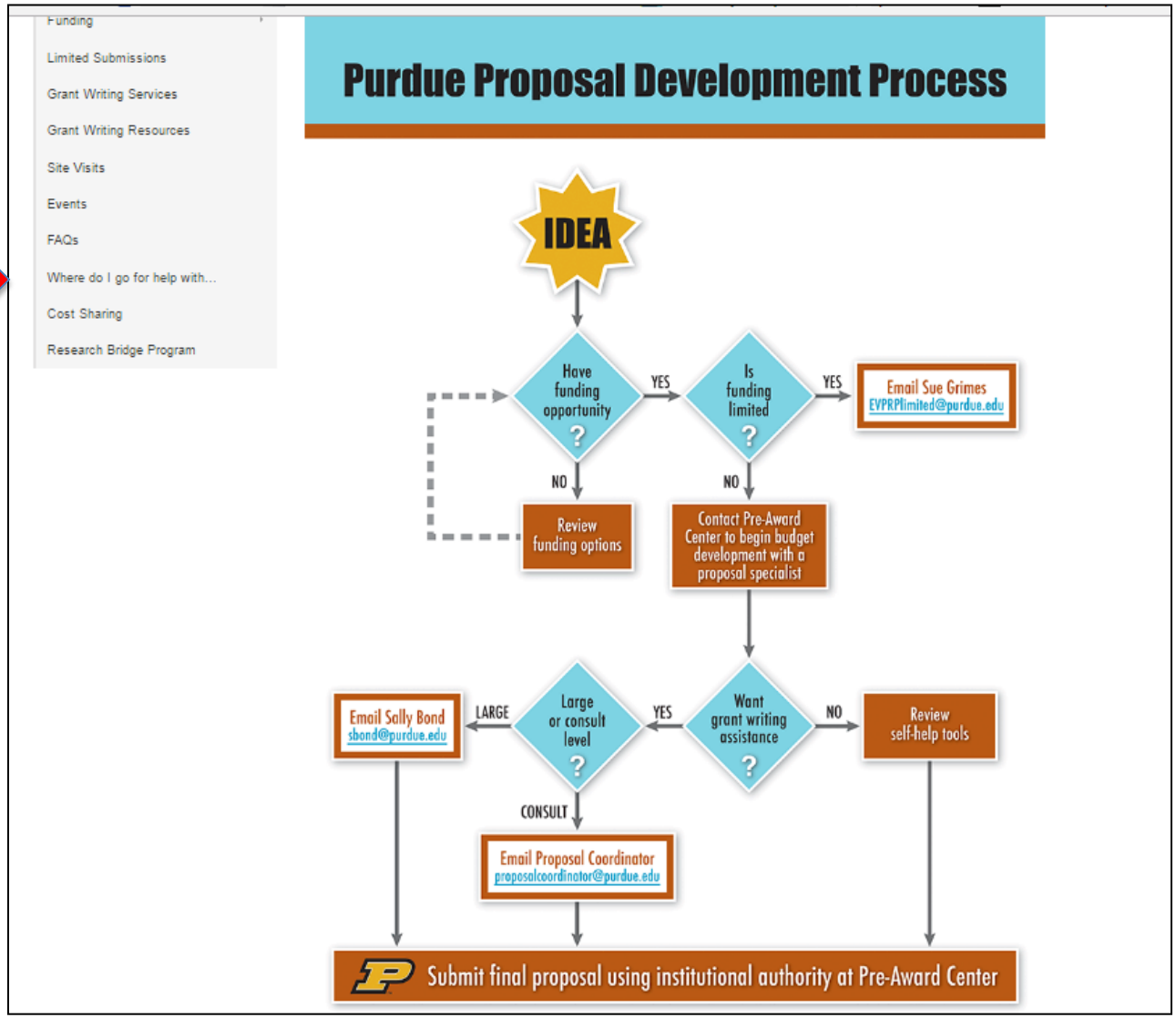
Purdue Research Development

Office for the Vice President for Research and Partnerships



Where Do I Go for Help with….?

http://www.purdue.edu/research/funding-and-grant-writing/flow-chart.php



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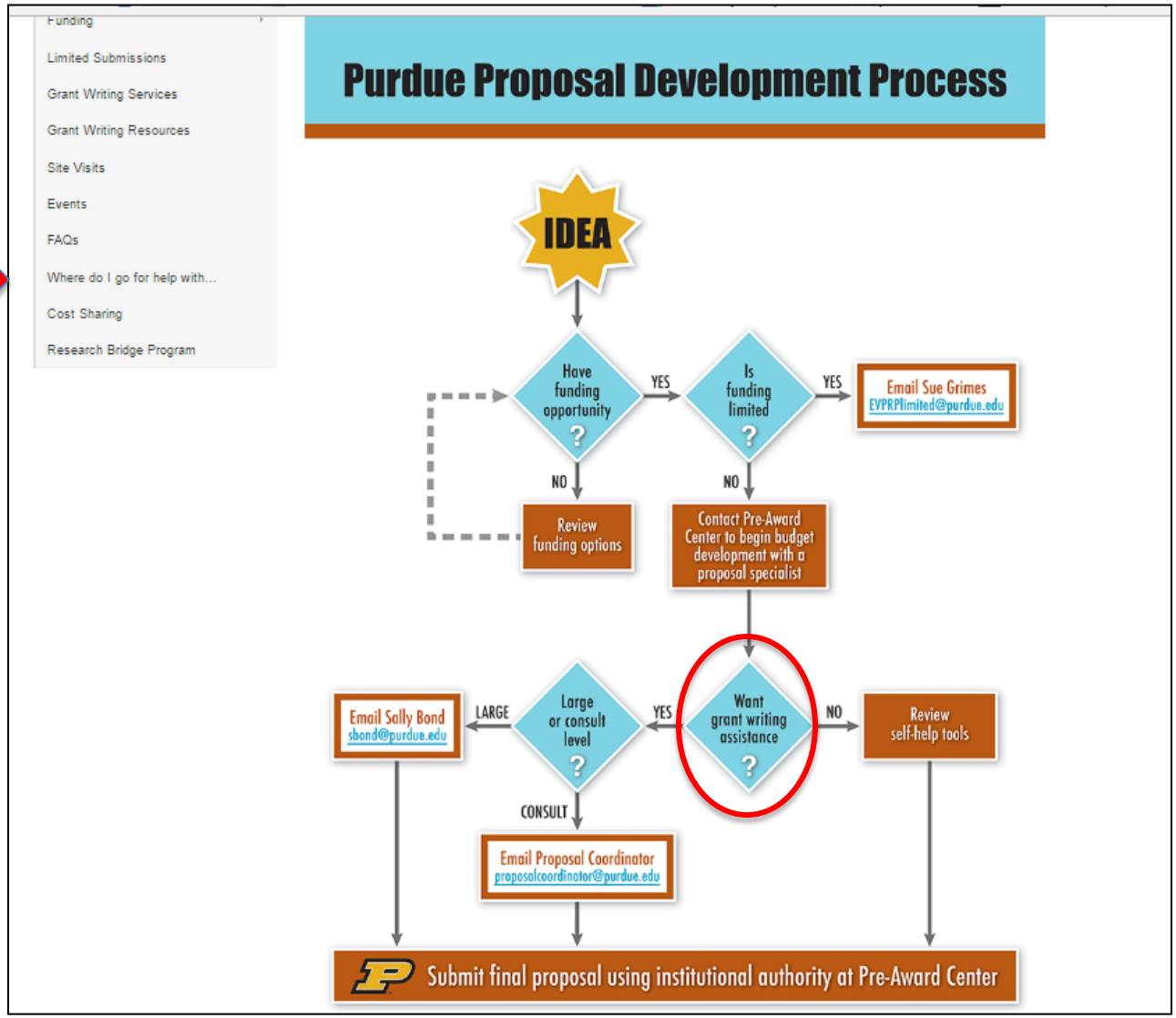
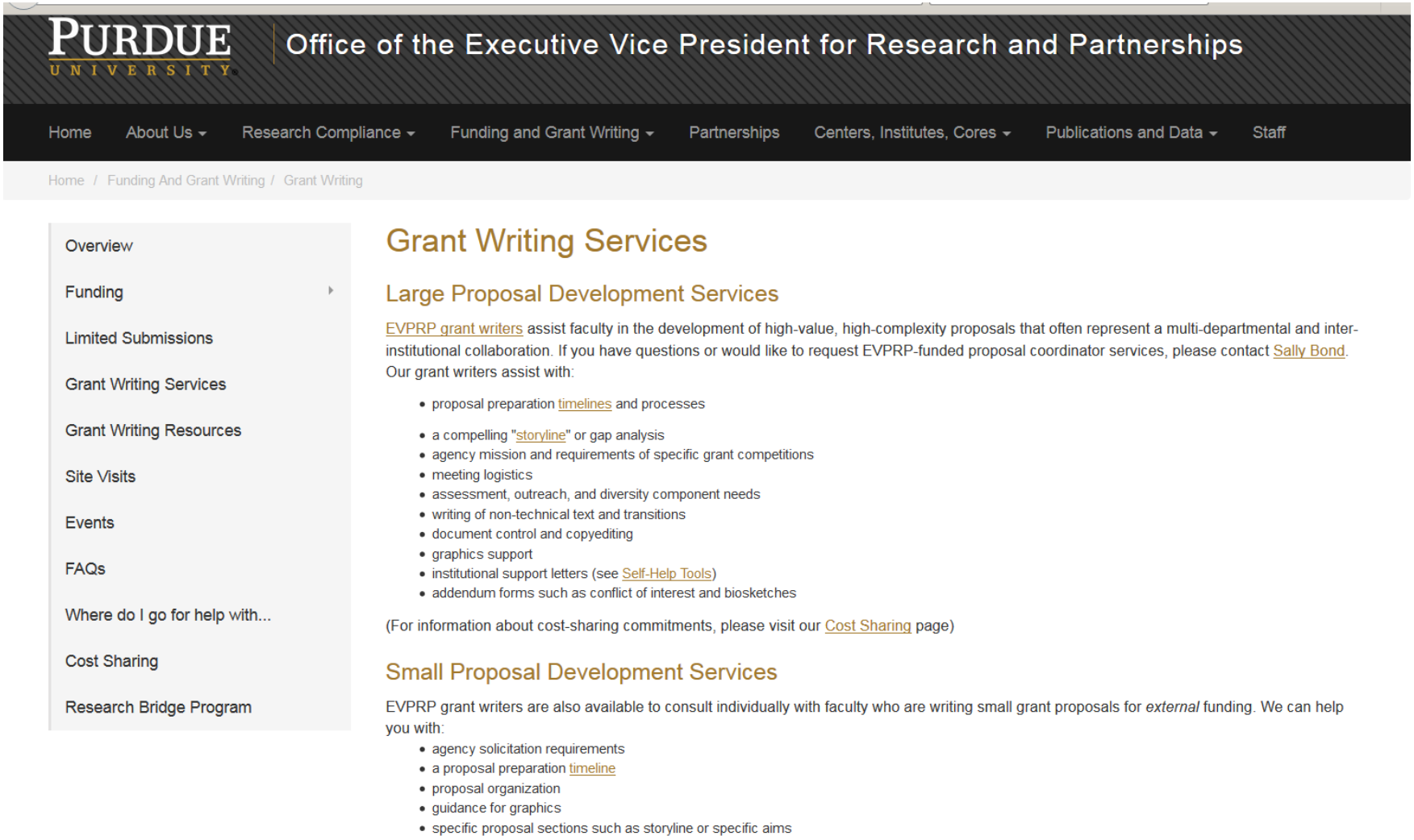


Grant Writing Services

Help available for both large and small proposals



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- Events
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- Where do I go for help with...
- Cost Sharing
- Research Bridge Program

Grant Writing Services

Large Proposal Development Services

EVPRP grant writers assist faculty in the development of high-value, high-complexity proposals that often represent a multi-departmental and inter-institutional collaboration. If you have questions or would like to request EVPRP-funded proposal coordinator services, please contact Sally Bond. Our grant writers assist with:

- proposal preparation timelines and processes
- a compelling "storyline" or gap analysis
- agency mission and requirements of specific grant competitions
- meeting logistics
- assessment, outreach, and diversity component needs
- writing of non-technical text and transitions
- document control and copyediting
- graphics support
- institutional support letters (see Self-Help Tools)
- addendum forms such as conflict of interest and biosketches

(For information about cost-sharing commitments, please visit our Cost Sharing page)

Small Proposal Development Services

EVPRP grant writers are also available to consult individually with faculty who are writing small grant proposals for *external* funding. We can help you with:

- agency solicitation requirements
- a proposal preparation timeline
- proposal organization
- guidance for graphics
- specific proposal sections such as storyline or specific aims

Grant Writing Resources

Templates, tools, boilerplate

Grant Writing Resources

Quick Reference Guides

- Proposal Prep 101
- Where do I go for Help with...?
- A Guide to the Grants Process at Purdue University This booklet, created by EVPRP Research Development staff, includes useful information regarding processes and resources related to funding and research grant administration at Purdue. A must read for new faculty.
- Preparing to Meet with Your Program Manager This guide provides tips for a successful visit with a program manager.

Purdue Drop-in Text

Find up-to-date "boilerplate" text for Purdue institutional resources and facilities at the EVPRP e-Pubs site for use, either in entirety or pertinent portions, in proposals submitted to funding agencies. Documents are searchable by keyword and include citations to avoid plagiarism.

Self-Help Tools for Proposal Preparation

This series provides step-wise guidance, samples, and/or tailorable text for some of the non-research-related requirements of a proposal submission. *Note: Only accessible from the purdue.edu domain.

- **Tool # 1:** Management Plan Self-Assessment
- **Tool # 2:** Annotated Letters of Individual or Institutional Commitment
- **Tool # 3:** Postdoctoral Mentoring Plan Template
- **Tool # 4:** Preparing Major or Shared Research Instrumentation Proposals

Broader Impacts Resources

All NSF proposals must include a section within the Project Description that discusses the broader impacts of the proposed activities. The resources below may be helpful in completing this requirement.

- Virtual Rolodex of Potential Education and Outreach Partners Proposal-focused information on campus resources you can leverage for broad impacts.
- Steps to Leveraging Campus Resources for Broader Impacts This figure walks you through best practices for incorporating broader impacts in your research proposal.
- NSF Merit Review FAQs from January 2013 These FAQs help clarify recent policy changes for merit review of broader impacts.
- Center for Ocean Sciences Education Excellence's ***Broader Impacts 2.0®*** This excellent document from COSEE helps to clarify the broader impacts criterion and provides practical tips for addressing broader impacts in your proposal.

Grant Writing Resources

Proposal Prep 101

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	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

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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Distribute documents noted in RFP										
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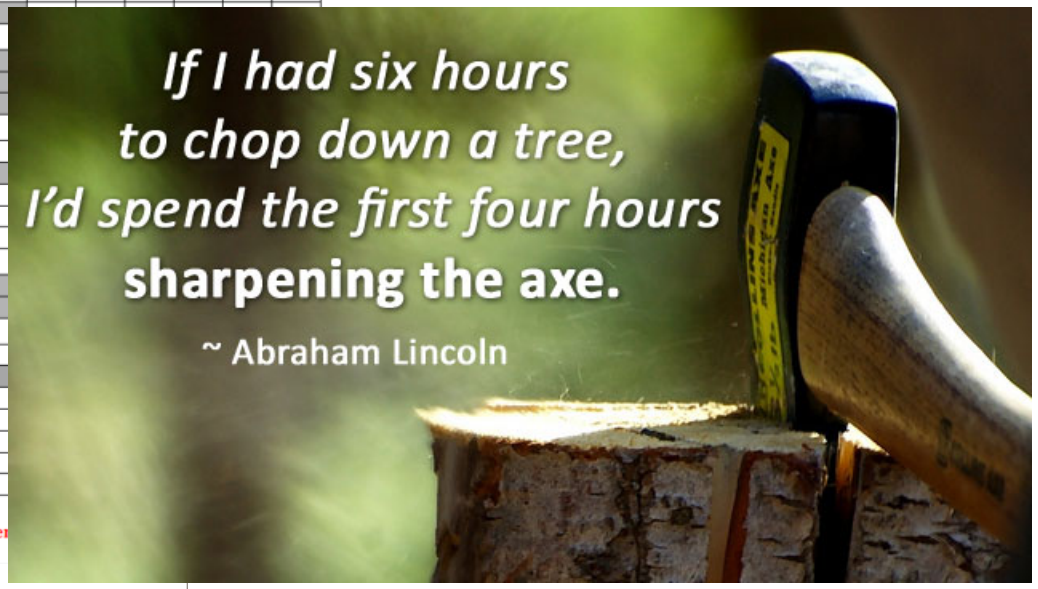


Build the Storyline

Remember…you are not the audience. Don't write for yourself.

- show something important is at stake
- answer "So what?"
- make it memorable, not complex, and have clear logic flow
- back it up with targeted proof not just anecdotal.

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

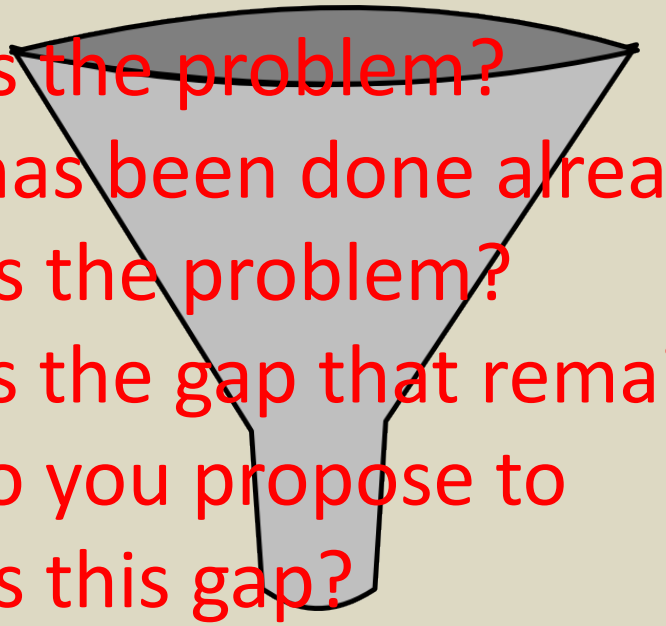
- tell a compelling story
- respond to solicitation
- answe
- know
- condu

- 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 to solicitation
- 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

Start with phrase answers (Example from Brenda Capobianco NSF IUSE)

What is the problem?

- Next generation standards highlight integration of engineering and technology into science education
- However, current K-12 science curriculum/pedagogy does not equip teachers to include engineering in their classroom. Particularly a problem at elementary level where teachers have less preparation in science and no formal exposure to engineering

What has been done to address this problem?

- Texas UTeach, Boston Museum of Science's Engineering is Elementary, Purdue's Science Learning through Engineering Design
- Integrate engineering design for **inservice** elementary teacher
- strong proof-of-concept that elementary teachers can effectively translate concepts

What is the gap that remains?

- despite strong local/regional impact, not scalable or sustainable
- requires continual district resourcing and limited capacity to reach 1.6 million elementary science teachers

How do you propose to address this gap?

- Immerse **preservice** teachers in authentic engineering design-based science learning

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:**

Build the Storyline

Where do you put it?

- as soon as solicitation allows!
  - background, rational, vision and goals
- NIH
  - start of specific aims page and then expanded version in significance section

Build the Storyline

Create a one-page brief

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

- concise storyline
- vision/goals
- team
- methodology/approach
- impact

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

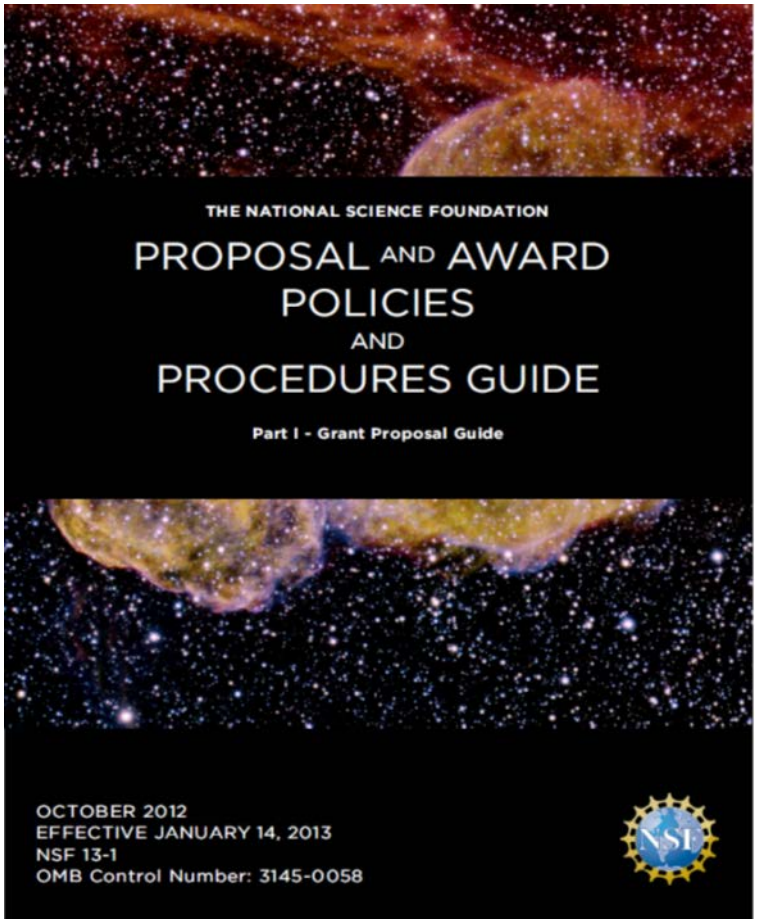
Respond to Solicitation

Do not be returned without review!!

- Eligibility, due date, length, margins
- But also…
  - prescriptive headings
  - merit review criteria in ***multiple*** locations
  - cited documents for language, rationale

Respond to Solicitation

Follow all instructions! Know the agency guidelines as well as solicitation



Research on Education and Learning (REAL)

PROGRAM SOLICITATION
NSF 13-604

REPLACES DOCUMENT(S):
NSF 10-516, NSF 12-542, NSF 12-552

National Science Foundation

Directorate for Education & Human Resources
Research on Learning in Formal and Informal Settings

Letter of Intent Due Date(s) ***(optional)*** (due by 5 p.m. proposer's local time)*:*

October 25, 2013

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

January 10, 2014

IMPORTANT INFORMATION AND REVISION NOTES

A revised version of the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), NSF 13-1, was issued on October 4, 2012 and is effective for proposals submitted, or due, on or after January 14, 2013. Please be advised that the guidelines contained in NSF 13-1 apply to proposals submitted in response to this funding opportunity.

Please be aware that significant changes have been made to the PAPPG to implement revised merit review criteria based on the National Science Board (NSB) report, National Science Foundation's Merit Review Criteria: Review and Revisions. While the two merit review criteria remain unchanged (Intellectual Merit and Broader Impacts), guidance has been provided to clarify and improve the function of the criteria. Changes will affect the project summary and project description sections of proposals. Annual and final reports also will be affected.

A by-chapter summary of this and other significant changes is provided at the beginning of both the *Grant Proposal Guide* and the *Award & Administration Guide*.

Please note that this program solicitation may contain supplemental proposal preparation guidance and/or guidance that deviates from the guidelines established in the Grant Proposal Guide.

Revision Summary

This solicitation has been revised to incorporate into the Other Information section a newly issued publication jointly developed by the National Science Foundation and the Institute of Education Sciences in the U.S. Department of Education entitled, *Common Guidelines for Education Research and Development*. The *Guidelines* describe six types of research studies that can generate evidence about how to increase student learning. Research types include those that generate the most fundamental understandings related to education and learning; examinations of associations between variables; iterative design and testing of strategies or interventions; and assessments of the impact of a fully-developed intervention on an education outcome. For each research type, there is a description of the purpose and the expected empirical and/or theoretical justifications, types of project outcomes, and quality of evidence.

The *Guidelines* publication can be found on the NSF website with the number NSF 13-126 (http://www.nsf.gov/pubs/2013/nsf13126/nsf13126.pdf). A set of FAQs regarding the *Guidelines* are

Respond to Solicitation

Know general guidelines but solicitation can trump.

Part I Overview Information

Department of Health and Human Services

Participating Organizations
National Institutes of Health (NIH), (http://www.nih.gov/)

Components of Participating Organizations
This RFA is developed as a Roadmap initiative. All NIH Institutes and Centers participate in Roadmap initiatives. This RFA will be administered by the National Center for

Title: Institutional Clinical and Translational Science Award (U54)

Announcement Type
This is a reissue of RFA-RM-06-002, which was released previously October 12, 2005.

Update: The following update relating to this announcement has been issued:

- March 22, 2007 - This RFA has been reissued as (RFA-RM-07-007).
- November 8, 2006 (NOT-RR-07-003) - See Notice NOT-RR-07-003 for clarification, Institutional Clinical and Translational Science Award(U54).

Request For Applications (RFA) Number: RFA-RM-07-002

Catalog of Federal Domestic Assistance Number(s)
93.389, 93.310

Key Dates
Release Date: August 22, 2006
Letters of Intent Receipt Date(s): December 18, 2006
Application Receipt Date: January 17, 2007
Peer Review Date(s): Summer 2007
Council Review Date(s): September 2007
Earliest Anticipated Start Date(s): September 30, 2007
Additional Information To Be Available Date (URL Activation Date): October 2006
Expiration Date: January 18, 2007

Due Dates for E.O. 12372

Not Applicable

Additional Overview Content

Executive Summary

- Growing barriers between clinical and basic research, along with the ever increasing complexities involved in conducting clinical research, are making it more diff enterprise at a time when it should be expanding.
- The purpose of this initiative is to assist institutions to create a uniquely transformative, novel, and integrative academic home for Clinical and Translational Scien information technologies to promote the application of new knowledge and techniques to patient care. Clinical and Translational Science Awards (CTSAs) will attr

FORMS VERSION D SERIES
Released: March 25, 2016
Revised: June 10, 2016

GENERAL INSTRUCTIONS FOR NIH AND OTHER PHS AGENCIES

SF424 (R&R) Application Packages

Guidance developed and maintained by NIH for preparing and submitting applications via Grants.gov to NIH and other PHS agencies using the SF424 (R&R)

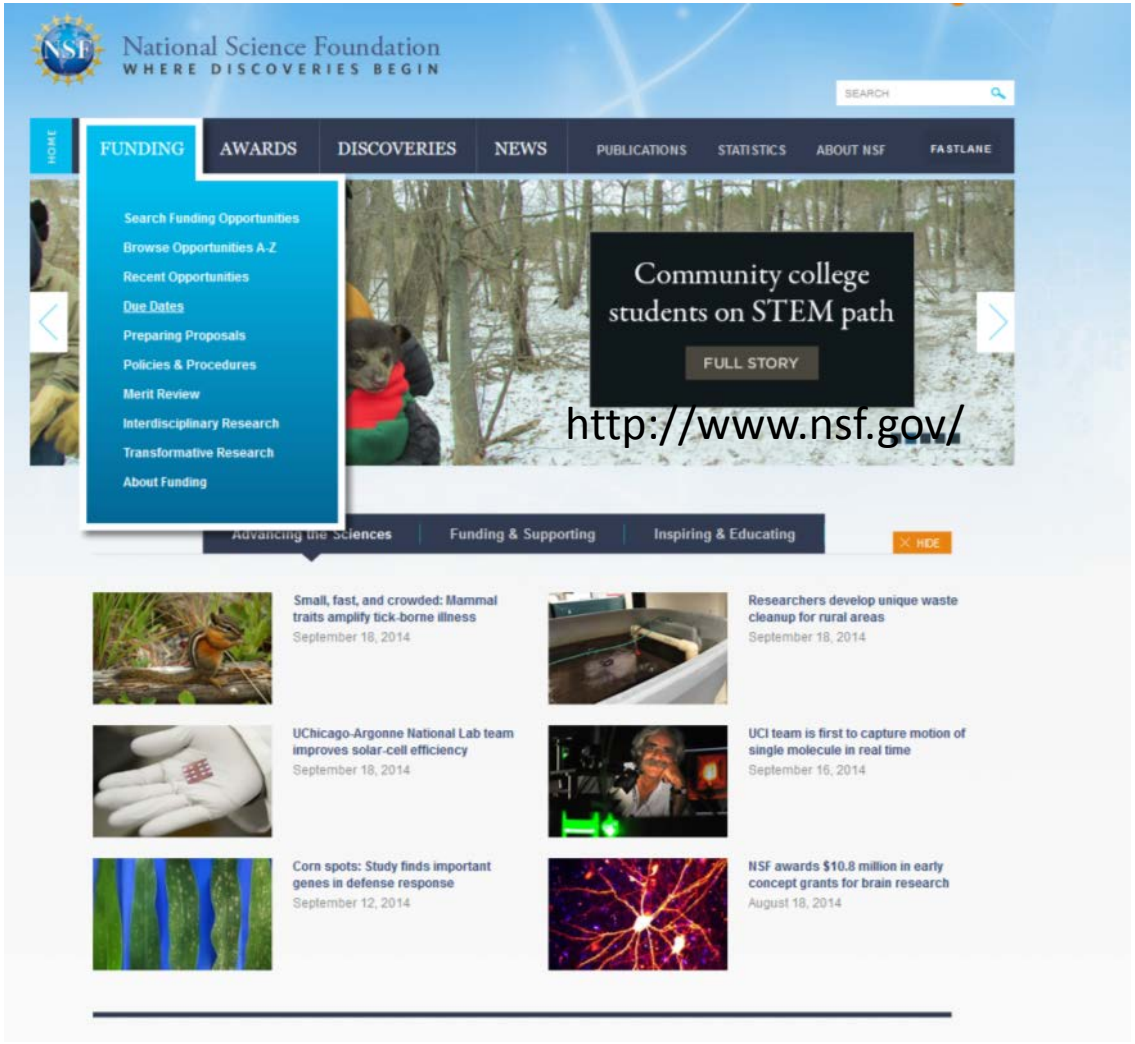
Respond to Solicitation

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

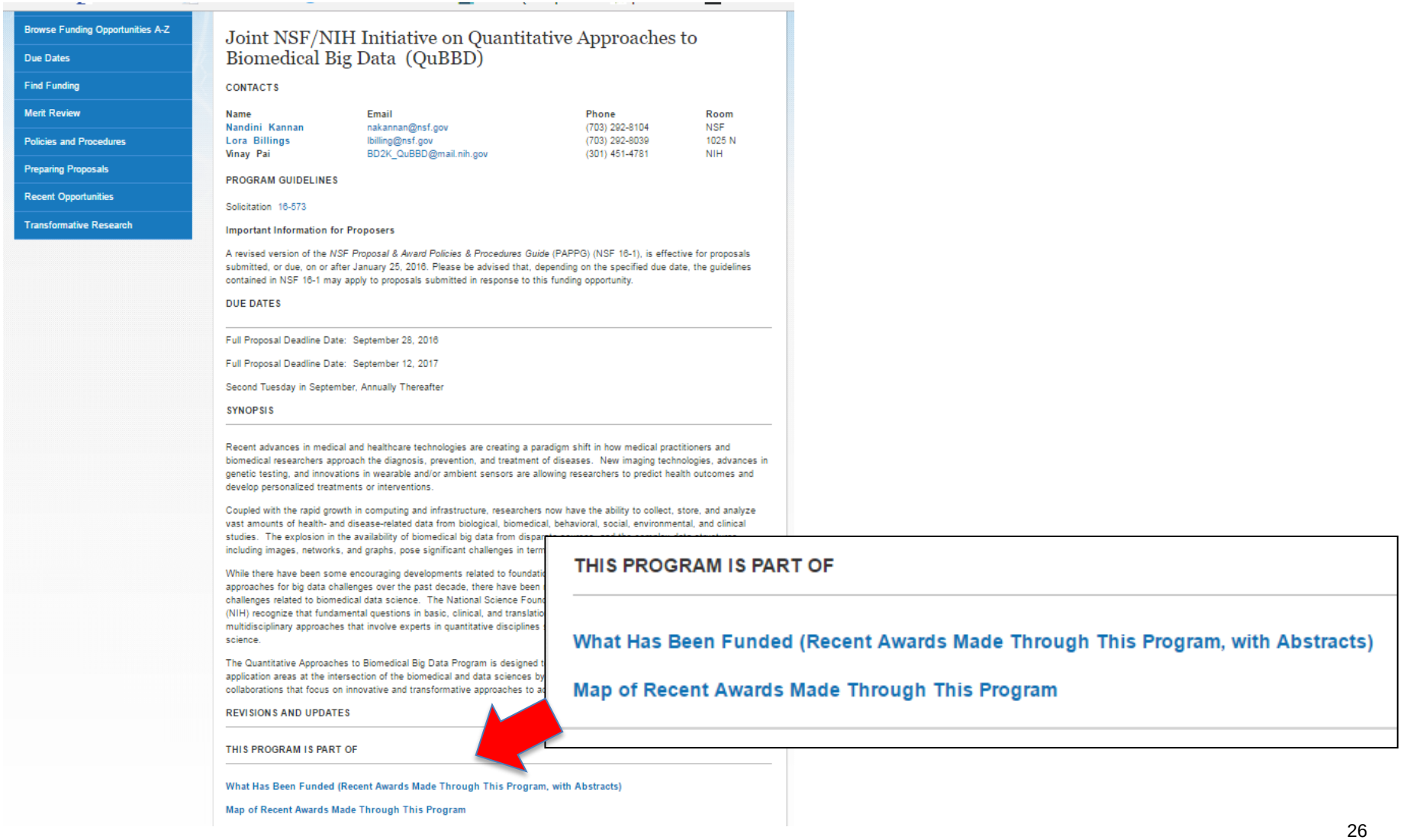
Agency websites often show what was previously funded.



www.nsf.gov

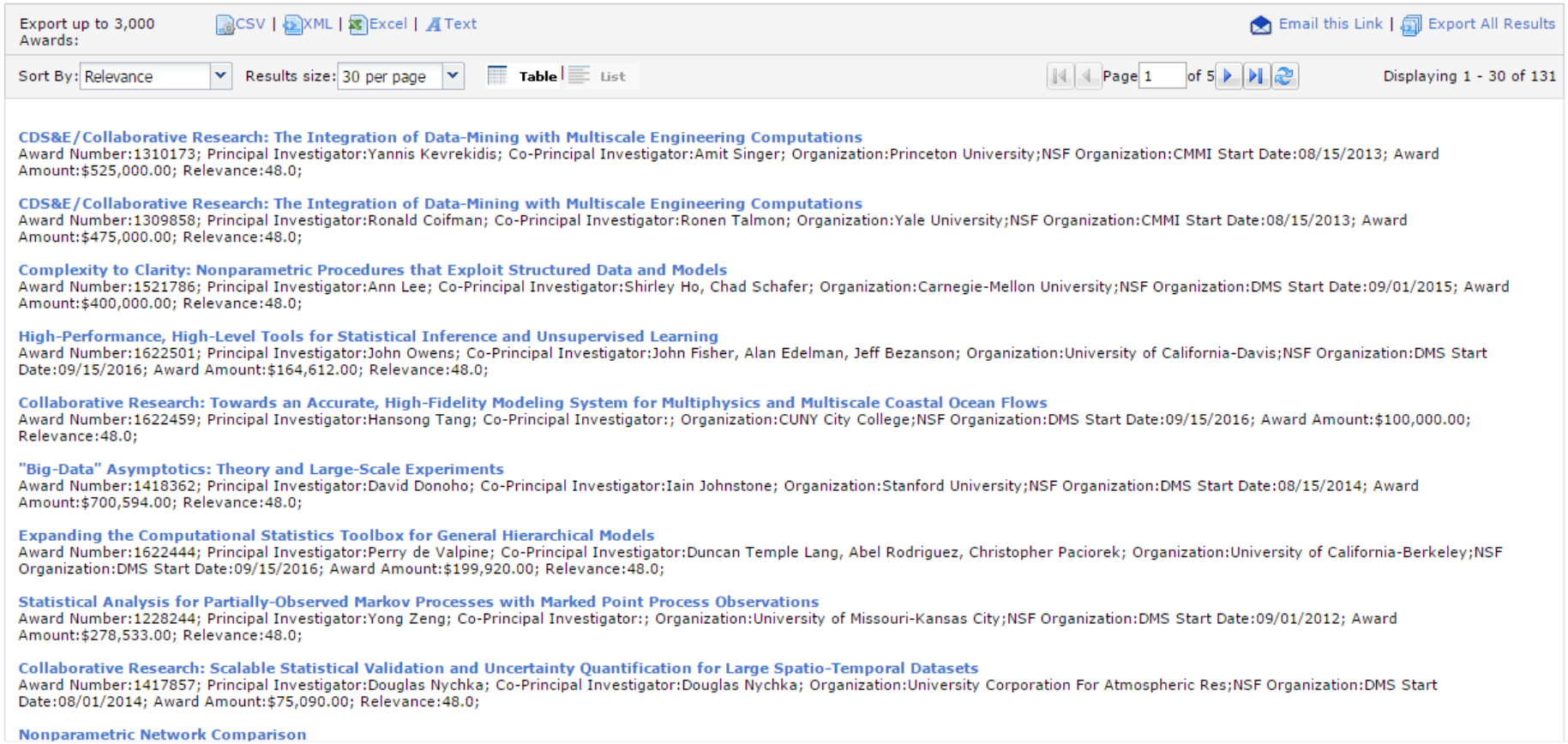
Respond to Solicitation

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



Respond to Solicitation

Review related abstracts.



Export up to 3,000 Awards: CSV | XML | Excel | Text — Email this Link | Export All Results

Sort By: Relevance — Results size: 30 per page — Table | List — Page 1 of 5 — Displaying 1 - 30 of 131

CDS&E/Collaborative Research: The Integration of Data-Mining with Multiscale Engineering Computations
Award Number:1310173; Principal Investigator:Yannis Kevrekidis; Co-Principal Investigator:Amit Singer; Organization:Princeton University;NSF Organization:CMMI Start Date:08/15/2013; Award Amount:$525,000.00; Relevance:48.0;

CDS&E/Collaborative Research: The Integration of Data-Mining with Multiscale Engineering Computations
Award Number:1309858; Principal Investigator:Ronald Coifman; Co-Principal Investigator:Ronen Talmon; Organization:Yale University;NSF Organization:CMMI Start Date:08/15/2013; Award Amount:$475,000.00; Relevance:48.0;

Complexity to Clarity: Nonparametric Procedures that Exploit Structured Data and Models
Award Number:1521786; Principal Investigator:Ann Lee; Co-Principal Investigator:Shirley Ho, Chad Schafer; Organization:Carnegie-Mellon University;NSF Organization:DMS Start Date:09/01/2015; Award Amount:$400,000.00; Relevance:48.0;

High-Performance, High-Level Tools for Statistical Inference and Unsupervised Learning
Award Number:1622501; Principal Investigator:John Owens; Co-Principal Investigator:John Fisher, Alan Edelman, Jeff Bezanson; Organization:University of California-Davis;NSF Organization:DMS Start Date:09/15/2016; Award Amount:$164,612.00; Relevance:48.0;

Collaborative Research: Towards an Accurate, High-Fidelity Modeling System for Multiphysics and Multiscale Coastal Ocean Flows
Award Number:1622459; Principal Investigator:Hansong Tang; Co-Principal Investigator:; Organization:CUNY City College;NSF Organization:DMS Start Date:09/15/2016; Award Amount:$100,000.00; Relevance:48.0;

"Big-Data" Asymptotics: Theory and Large-Scale Experiments
Award Number:1418362; Principal Investigator:David Donoho; Co-Principal Investigator:Iain Johnstone; Organization:Stanford University;NSF Organization:DMS Start Date:08/15/2014; Award Amount:$700,594.00; Relevance:48.0;

Expanding the Computational Statistics Toolbox for General Hierarchical Models
Award Number:1622444; Principal Investigator:Perry de Valpine; Co-Principal Investigator:Duncan Temple Lang, Abel Rodriguez, Christopher Paciorek; Organization:University of California-Berkeley;NSF Organization:DMS Start Date:09/15/2016; Award Amount:$199,920.00; Relevance:48.0;

Statistical Analysis for Partially-Observed Markov Processes with Marked Point Process Observations
Award Number:1228244; Principal Investigator:Yong Zeng; Co-Principal Investigator:; Organization:University of Missouri-Kansas City;NSF Organization:DMS Start Date:09/01/2012; Award Amount:$278,533.00; Relevance:48.0;

Collaborative Research: Scalable Statistical Validation and Uncertainty Quantification for Large Spatio-Temporal Datasets
Award Number:1417857; Principal Investigator:Douglas Nychka; Co-Principal Investigator:Douglas Nychka; Organization:University Corporation For Atmospheric Res;NSF Organization:DMS Start Date:08/01/2014; Award Amount:$75,090.00; Relevance:48.0;

Nonparametric Network Comparison

Respond to Solicitation

Review related abstracts.

Search Awards

Recent Awards

Presidential and Honorary Awards

About Awards

How to Manage Your Award

Grant Policy Manual

Grant General Conditions

Cooperative Agreement Conditions

Special Conditions

Federal Demonstration Partnership

Policy Office Website

Award Abstract #1622501

High-Performance, High-Level Tools for Statistical Inference and Unsupervised Learning

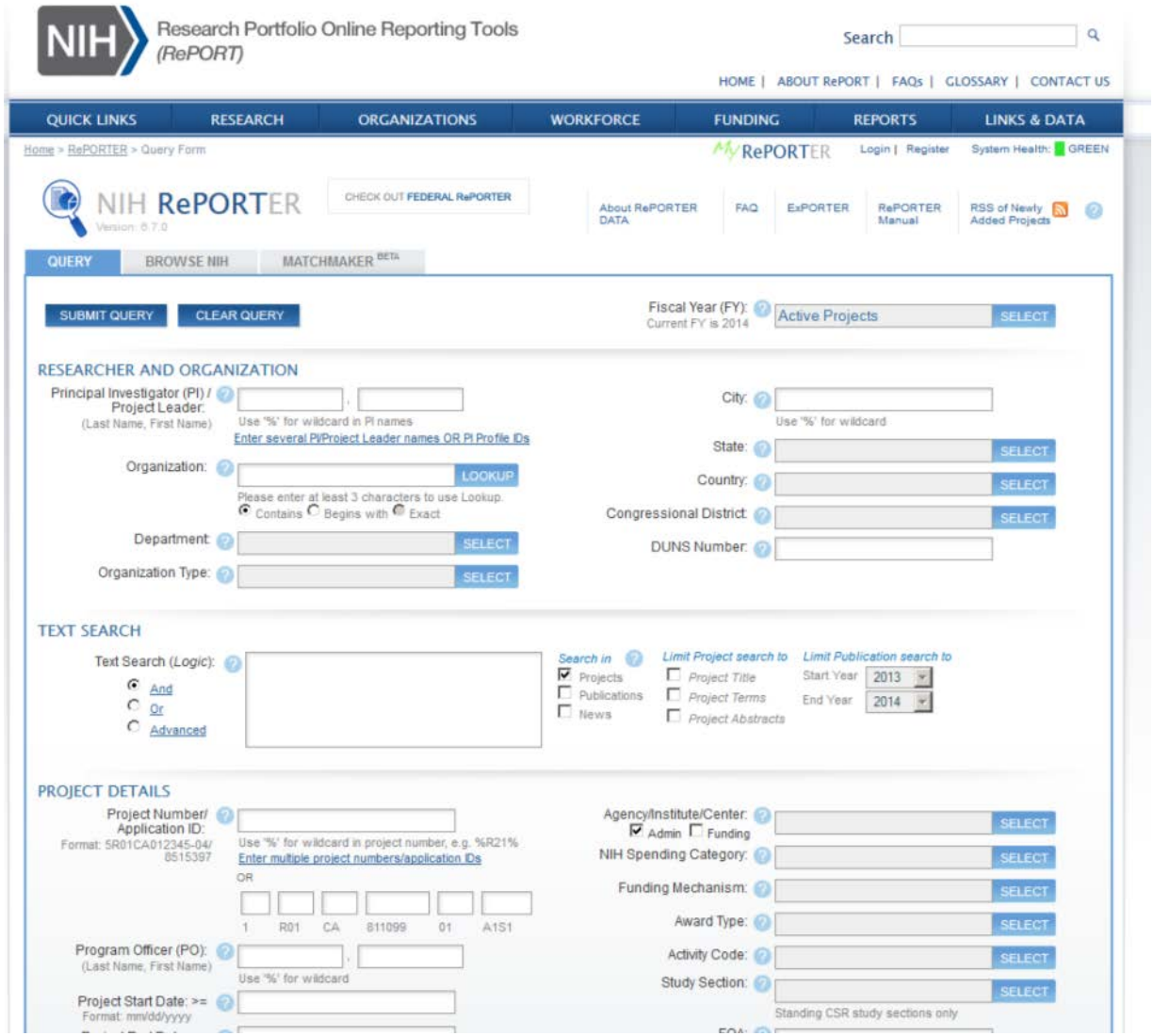
NSF Org:	DMS Division Of Mathematical Sciences
Initial Amendment Date:	September 13, 2016
Latest Amendment Date:	September 13, 2016
Award Number:	1622501
Award Instrument:	Continuing grant
Program Manager:	Yong Zeng DMS Division Of Mathematical Sciences MPS Direct For Mathematical & Physical Scien
Start Date:	September 15, 2016
End Date:	August 31, 2019 (Estimated)
Awarded Amount to Date:	$164,612.00
Investigator(s):	John Owens jowens@ece.ucdavis.edu (Principal Investigator) John Fisher (Co-Principal Investigator) Alan Edelman (Co-Principal Investigator) Jeff Bezanson (Co-Principal Investigator)
Sponsor:	University of California-Davis OR/Sponsored Programs Davis, CA 95618-6134 (530)754-7700
NSF Program(s):	CDS&E-MSS, CDS&E
Program Reference Code(s):	7433, 8083, 8084, 9263
Program Element Code(s):	8069, 8084

ABSTRACT

Using the "Julia" language for scientific computing developed at MIT, the UC Davis, MIT, and Julia Computing, Inc. teams funded by this project will extend the Julia language and runtime to utilize massively-parallel graphics processing units (GPUs) as first-class processors for scientific computing. Julia offers the twin advantages of straightforward, high-level programmability as well as excellent performance; adding GPU capability within Julia opens the door to even greater performance. The team will use Julia and its new

Respond to Solicitation

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



Respond to Solicitation

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

NIH Research Portfolio Online Reporting Tools (RePORT)

Search

HOME | ABOUT RePORT | FAQs | GLOSSARY | CONTACT US

QUICK LINKS | RESEARCH | ORGANIZATIONS | WORKFORCE | FUNDING | REPORTS | LINKS & DATA

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Search Results

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There were 4946 results matching your search criteria. Records per page 25 Show/Hide Search Criteria

Click on the column header to sort the results 1 2 3 4 ... 196 197 198 Page 1 of 198 Next Last

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
4	R01	DK089201	05		CONSERVED FETAL EPIGENOMIC SIGNATURES IN A PRIMATE MODEL OF MATERNAL OBESITY	AAGAARD, KJERSTI MARIE	BAYLOR COLLEGE OF MEDICINE	2016	NIDDK	NIDDK	$287,212	
1	F31	DK111186	01		OBESITY AND DIABETES AS MEDIATORS OF BENIGN PROSTATIC HYPERPLASIA	AARON, LATAYIA	MEHARRY MEDICAL COLLEGE	2016	NIDDK	NIDDK	$40,417	
4	P20	GM103527	09	5042	ROLE OF BIOACTIVE LIPIDS IN THE PROTECTIVE PATHWAYS OF OBESITY IN ISCHEMIC CARDI	ABDEL-LATIF, AHMED	UNIVERSITY OF KENTUCKY	2016	NIGMS		*$255,850*	
4	UH3	TR000928	04		TARGETING TUMOR-DERIVED EXRNA-CONTAINING MICROVESICLES BY HIGH THROUGHPUT SCREENI	ABDEL-MAGEED, ASIM B	TULANE UNIVERSITY OF LOUISIANA	2016	NCATS	OD	$999,920	
4	R01	HL117626	04		STUDIES OF RARE GENETIC VARIATION IN THE ISOLATED POPULATION OF SARDINIA	ABECASIS, GONCALO	UNIVERSITY OF MICHIGAN	2016	NHLBI	NHLBI	$711,517	
7	R01	HL108379	04		INSULIN RESISTANCE AND MYOCARDIAL AUTOPHAGY	ABEL, E DALE	UNIVERSITY OF IOWA	2014	NHLBI	NHLBI	$369,950	
5	R01	HL112413	02		CARDIAC DYSFUNCTION IN THE MET SYNDROME: CROSS-TALK BETWEEN IR AND BAR SIGNALING	ABEL, E DALE et al.	UNIVERSITY OF IOWA	2016	NHLBI	NHLBI	$386,250	
5	R01	HL127764	02		INSULIN INHIBITION OF BETA-AR SIGNALING IN THE MYOCARDIUM	ABEL, E DALE et al.	UNIVERSITY OF IOWA	2016	NHLBI	NHLBI	$594,618	

Respond to Solicitation

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

NIH Research Portfolio Online Reporting Tools (RePORT)

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Project Information

4R01DK089201-05

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Project 1 of 4946 NEXT

DESCRIPTION | DETAILS | RESULTS | HISTORY | SUBPROJECTS | SIMILAR PROJECTS | NEARBY PROJECTS BETA | LINKS | NEWS AND MORE

Project Number: 4R01DK089201-05 **Former Number:** 5R01DK089201-05
Title: CONSERVED FETAL EPIGENOMIC SIGNATURES IN A PRIMATE MODEL OF MATERNAL **OBESITY**

Contact PI / Project Leader: AAGAARD, KJERSTI MARIE
Awardee Organization: BAYLOR COLLEGE OF MEDICINE

Abstract Text:

DESCRIPTION (provided by applicant): According to the Developmental Origins of Adult Disease Hypothesis, perturbations in the gestational orearly postnatal environment influence the development of adult diseases. Data from our laboratory and others collectively suggest that this occurs with reprogramming of gene expression via epigenetic changes to the 'histone code'. What constitutes the 'histone code'? While almost all cells of an individual bear near identical genomic constitutions, phenotype is ultimately determined by the gene expression profile. Gene expression is maintained by two major mechanisms: (1) transcription factors and post-transcriptional modifiers, and (2) epigenetic modifications, in particular DNA methylation and core-histone modifications. Research is rapidly demonstrating the importance of the epigenetic code to normal human development as well as the burden of disease that occurs when the epigenetic code or machinery malfunctions. However, it remains a fundamental question in the field of epigenomics research if and how the fetal epigenome varies in response to maternal phenotype and diet modifications, and if it is truly predictive of later in life disease states (suh as **obesity** and diabetes). Our lab is dedicated to studying the effects of the in utero milieu on epigenetic changes in the fetus. We have developed a non-human primate model of **obesity**, now in its ninth year, to study the fetal histone code. We have shown that it is maternal high fat diet consumption (rather than maternal **obesity** per se) which results in abnormal development of both the hypothalamic neurocircuitry and peripheral entrainment integral to regulation of fetal glucose and lipid homeostasis; these alterations are accompanied by epigenetic changes in chromatin structure resulting in reprogramming of fetal gene expression. As a result of this work, we are now uniquely poised to apply concomitantly developed high throughput sequencing technologies with advanced analytical approaches to decipher the molecular means by which the primate epigenome is modified. In this proposal we present our application of these technologies (ChIP-Seq, RNA-Seq, and custom CpG arrays) in our genome wide characterization of the fetal primate hepatic epigenome. Our studies are relevant to public health since they will clarify how the maternal diet influences the developing primate infant, and whether these changes increase the risk of later in life **obesity**.

Public Health Relevance Statement:

Given the growing body of evidence that many (if not the vast majority) of chronic, non-communicable disease have their origins in fetal life, understanding the in utero factors that impact fetal metabolism and development are among the most important public health issues of our time. Our lab is dedicated to studying the effects of the in utero miliu on epigenetic changes in the fetus. We have developed a non-human primate model of **obesity**, now in its ninth year, to study the fetal histone code. We have shown that it is maternal high fat diet consumption (rather than maternal **obesity** per se) which results in abnormal development of both the hypothalamic neurocircuitry and peripheral

Proposal Preparation Process

Always outline!

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	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										
Check proposal worksheet to verify for DLRC, DP, or other DP center credit										
Write summary or abstract										

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

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 HUBzero 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					
D&I Team and COD meeting					
Mentoring Academy					
Training of coaches/chairs					
Mentoring pairs					
Departmental Transformation					
Diversity Forums					
Chairs/Dept Heads @ PU					
All Three Institutions					
Transformational Team Visits					
NCWIT Visiting Committees					
Promotion and Tenure Review					
Building Networks					
Summit					
Invited Lectures					
Evaluation and Assessment					
STEM Climate Assessment					
Space/Resource Inventory					
Coaching Measures					
Mentor/Mentee percp/self-eff prod					
Attitudinal Surveys					
Deans and Heads					
Faculty					
Network Analysis					
External Project Analysis					
Dissemination					
Website					
CIC *Women in Academia*					
Summit Attendees Mailings					
Publications					
National 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
- get rid of passive voice whenever possible
- fix grammar and proof proposal

Know Your Reviewer

Parallel formatting provides a roadmap to help your reviewer

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Building Networks					
Summit					
Invited Lectures					
Evaluation and Assessment					
STEM Climate Assessment					
Space/Resource Inventory					
Coaching Measures					
Mentor/Mentee percp/self-eff/prod					
Attitudinal Surveys					
Deans and Heads					
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Know Your Reviewer

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

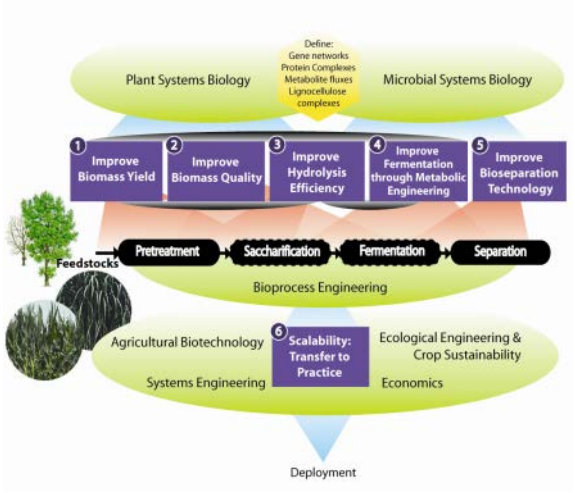
Elemental mapping of animal tissues has been investigated, and results have been documented.

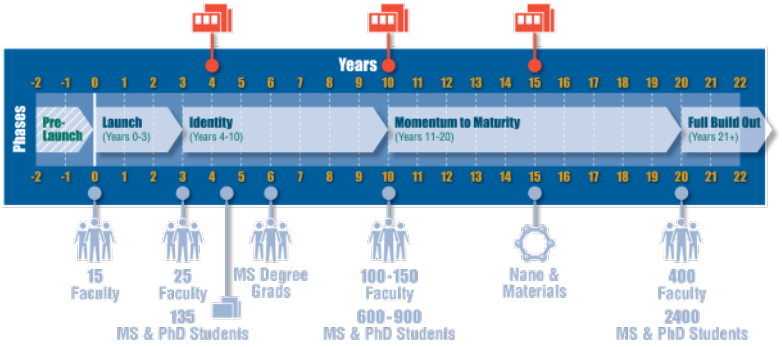
changed to:

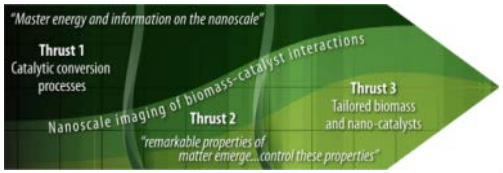
We investigated elemental mapping of animal tissues and documented results.

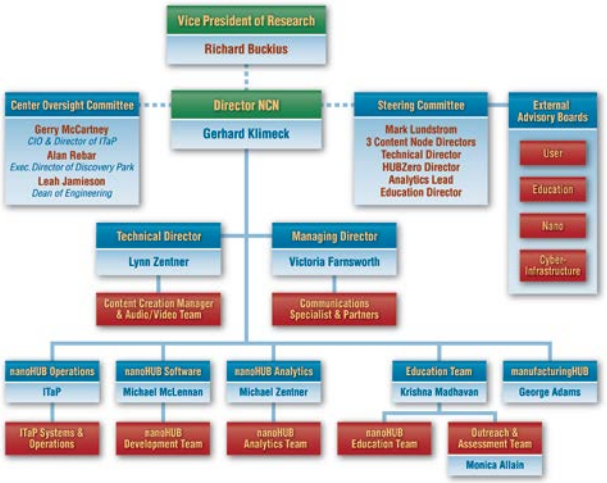
Know Your Reviewer

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										
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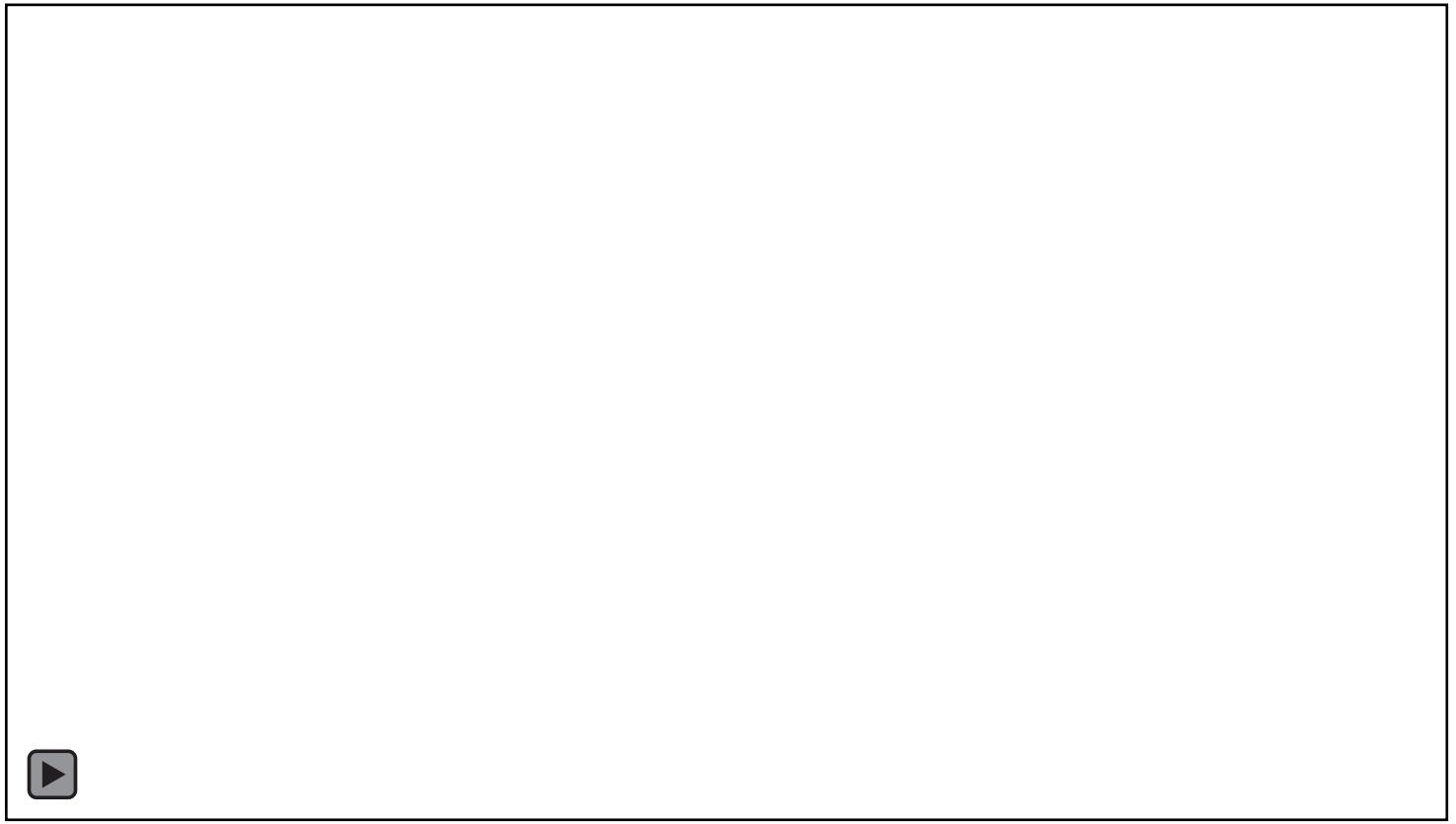
Team debrief on meeting										
Refine initial analysis/planning										
Proposed Outline										
Discuss/refine outline structure										
More detailed outline, if needed										
Identify graphics needed										
Partnerships										
Recruit collaborative partners										
Produce "talking 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

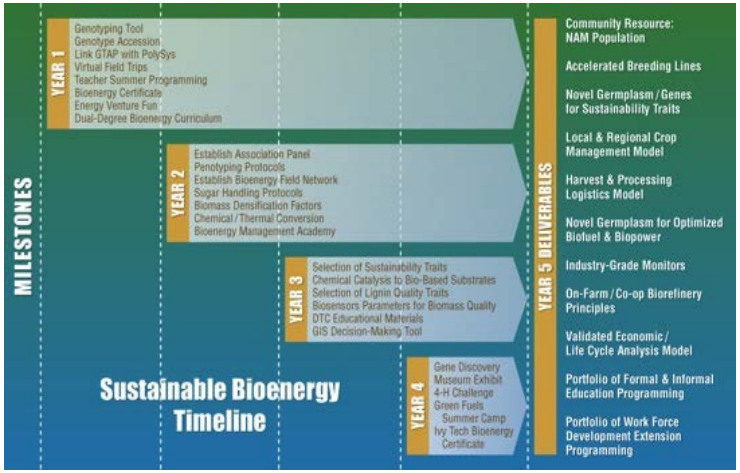
Internal Review

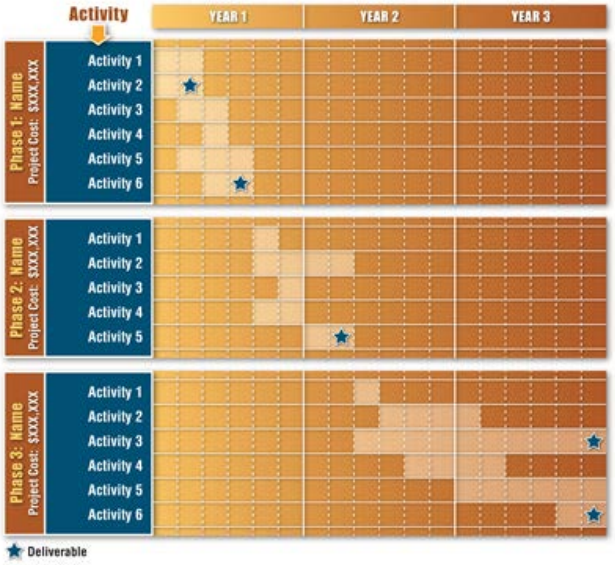
Because sometimes what is obvious to you is not obvious to others



What Else Can We Do for Your Proposal?

Develop high-quality graphics





What Else Can We Do for Your Proposal?

Writing content , leveraging resources, and managing the process

- one-page concept paper for PO
- campus partners and resources
- non-technical writing
- editing and copyediting
- document control

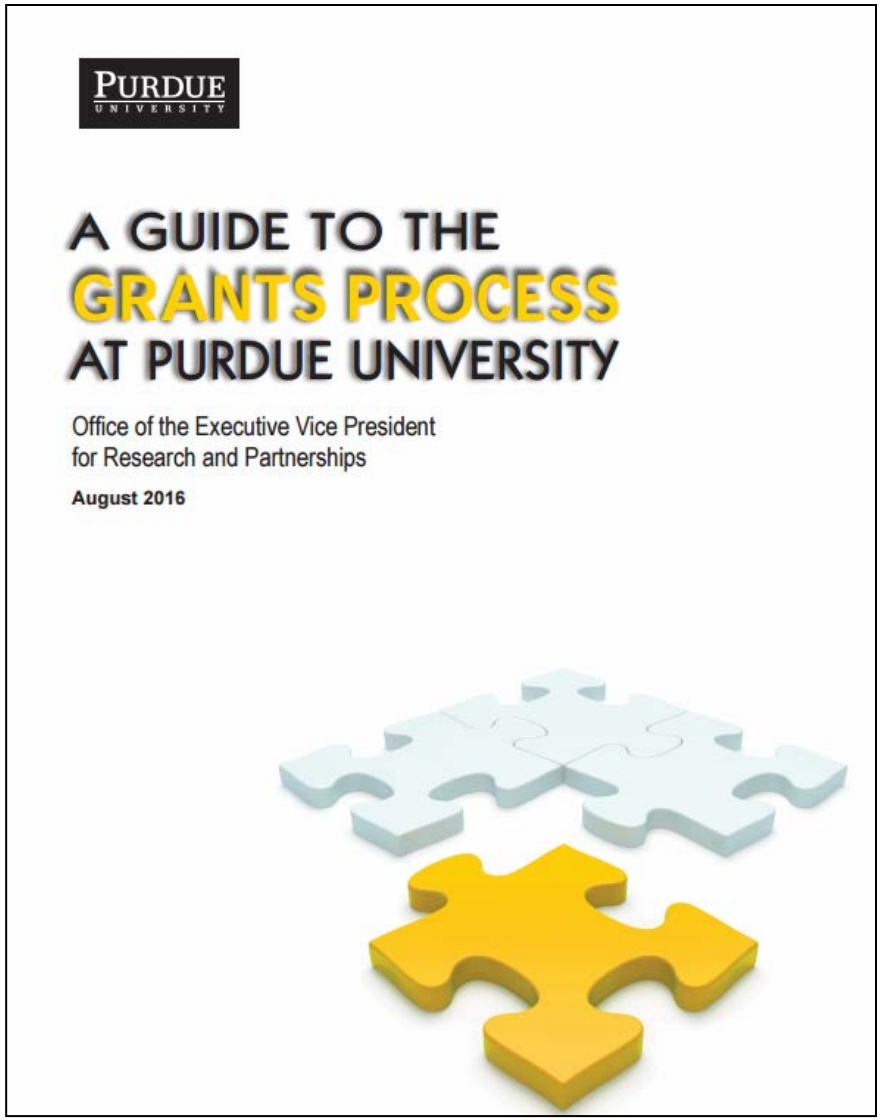
What Else Can We Do for Your Proposal?

Taming the supplementary documents

- letters
- biographical sketches
- conflict of interest lists
- postdoctoral mentoring plans
- data management plans
- work breakdown structures

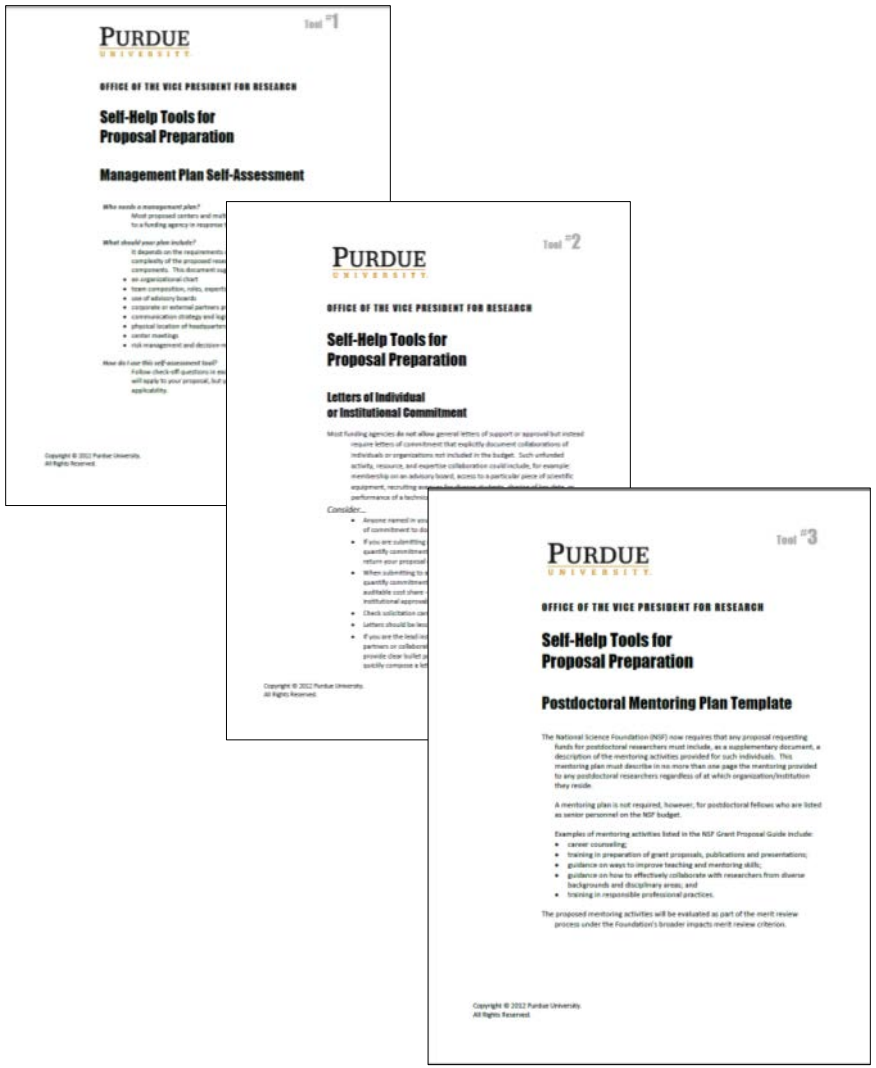
Key Online Resources

Who does what at Purdue to submit your proposal



Key Online Resources

Self-help tool series



- *Management Plan Self-Assessment*
- *Letters of Individual or Institutional Commitment*
- *Postdoctoral Mentoring Plan Template*
- *Tips for Major Research Instrumentation Proposals*

Key Online Resources

Data Management Plan Template and Sample

Basic Content Template of Data Management Plan

Expected Data

- Describe types of data, samples, physical collections, software other materials produced during the project.
- Describe what will be retained.
- Describe the potential impact within and outside researcher's maximize the data value

Period of Data Retention

Describe a period that should be a minimum of three years after th years after public release. You should reasonably be able to make after publication. Take into consideration longer retention periods longitudinal data sets.

Data Formats, Short-Term Storage, and Dissemination

- Describe the specific data formats, media, and dissemination a Important to use existing standards appropriate to the disciplin
- Describe how you will use local storage (and back up and sec archiving and preservation
- Describe policies for public access and sharing including prov protection of privacy, confidentiality, security, intellectual pro
- If a center or major partnership with industry or user commun be shared and managed with partners, center members, and ot
- If needed, state publication delay policies.

Long-term Data Storage and Preservation of Access

- Describe physical and cyber resources and facilities that will e research data. Your options are the Purdue Repository for Re appropriate data repository or archive (e.g. NCBI, LTER), or p website. [If using Purdue Repository for Research Data, you and cite Purdue Libraries/OVPR source].

Somewhere you also need to outline the roles and responsibilities retaining the research data. Include the plan for what happens if a institution.

Note: in collaborative proposals or proposals with sub-awards, the assuring data storage and access.

Note: any explanation of costs should be in the budget justificatio

Data Management Plan

This project will have three data sets associated with three different areas of the proposal: physical experiments on topological insulator (TI) materials and devices fabricated for this project (TI Set), code associated with theoretical modeling used to corroborate findings (Modeling Set), and outputs from the educational thrust (Educational Set). The following table summarizes the size and nature of these data sets. As per the attached letter of commitment, due to the working relationships between the research team and the Purdue-hosted NCN, the primary data as well as composite/interpreted data will be hosted and available to the larger scientific community on the nanoHUB for at least 5 years after the end of the project period. By this date, the researchers believe that due to the nature of research in this field, the raw data can be archived without live hosting and results will be sufficiently disseminated through publications. Relevant data will also be available in electronic version as possible in scientific journals where results are published.

Description and Documentation of Data by Set

The following table provides description of each data set.

Title	Description
TI Set—Primary Data	The primary data includes readings from physical experiments on the TI materials that support results published by the investigators. During experimentation, this data resides on a lab server and serves as the data used for plots used for analysis. Description and annotation derived from lab books and wikis. No standards exist for description of data but we will explore the applicability of Dublin Core metadata standards and relevant data will be connected with data sets in the same or separate ASCII files. PI is responsible for this activity
TI Set—plots and reports	Plots are generated from raw data for analysis, used as basis for interpretation and results deriving from experiments and used alongside with the theoretical models for analysis. Published papers provide sufficient documentation for the nanocommunity. PI is responsible for this activity.
Modeling Set	Code used to generate simulations stored on local servers with back up until published. Then published in related theses and articles; current practice is increasingly enabling the publishing of code in electronic form. Code is generally described in accompanying publications as well as in the code itself. Researchers will ensure necessary descriptors provided for all generated code before distribution and/or archiving on nanoHUB following standards used by

Key Online Resources

OVPR e-Pubs for searchable, citable, up-to-date institutional text

http://docs.lib.purdue.edu/ovpr/

Key Online Resources

OVPR e-Pubs for searchable, citable, up-to-date institutional text

Key Online Resources

OVPR e-Pubs for searchable, citable, up-to-date institutional text

Purdue University
Purdue e-Pubs

University General Facility Descriptions | Office of the Vice President of Research

2-21-2014

Discovery Park General Facilities Description

Candiss Vibbert
Purdue University, vibbert@purdue.edu

Purdue University Office of the Vice President for Research

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Discovery Park General Facilities

INITIATED: 2001
TOTAL BUILDINGS, EQUIPMENT, ENDOWMENTS, AND RESEARCH EXPENDITURES AS OF DECEMBER 31, 2013: $1.02 billion

Explore Purdue's unique interdisciplinary facilities, cutting-edge equipment and shared spaces for collaborative projects in areas such as life and health sciences; drug discovery and development; energy, climate change, water, the environment and food security; information technology, homeland security, and simulation of modeling new materials; nanotechnology, bionanotechnology and nanomedicine; and science, technology, engineering and mathematics (STEM) learning.

Facilities attract researchers and students from all 11 West Lafayette colleges, Purdue's regional campuses, Purdue Technology Centers throughout Indiana, Indiana University and the Indiana University School of Medicine, and countries such as South Korea, Australia, China, Russia, Uganda, Colombia, India and Azerbaijan.

Discovery Park sits on 40 acres bounded by State Street on the north, Nimitz Drive on the south, Airport Road on the west and South Martin Jischke Drive on the east. Its location fosters collaboration with researchers in the nearby Martin C. Jischke Hall of Biomedical Engineering, Ray W. Herrick Laboratories, and the Wayne T. and Mary T. Hockmeyer Hall. Additionally, the Drug Discovery Facility is located on the main campus, and the Discovery Park Partners Facility is approximately 1/4 mile west of campus.

The Lilly Endowment provided generous initial funding for the centers and programs in Discovery Park, recognizing the potential of Purdue's commitment to advancing its interdisciplinary research and translational capabilities to a new level of excellence and impact.

UNIQUE FEATURES: All facilities are shared. Highly collaborative, interdisciplinary projects are connected throughout Purdue and to Purdue Research Parks. Technology commercialization is facilitated through the Burton D. Morgan Center for Entrepreneurship, an ecosystem on campus conducive to invention and entrepreneurism from the newest undergraduate to the most senior researcher, and the University's strong partnership with the Purdue Research Park.

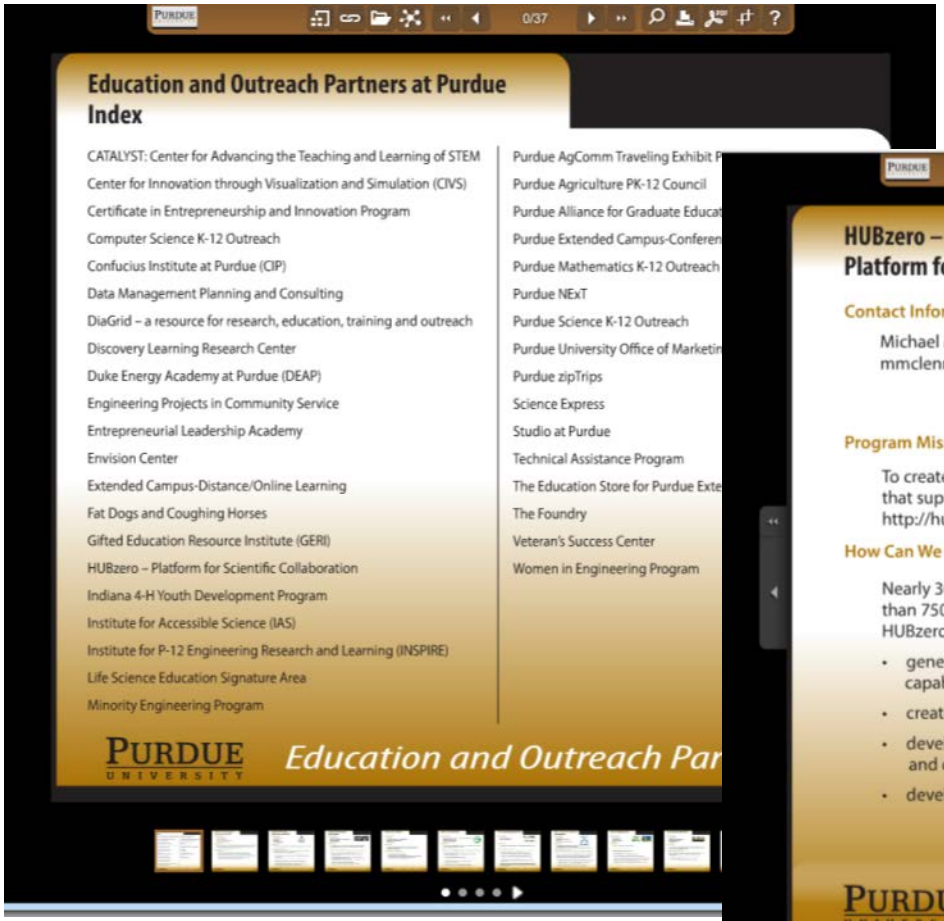
ECONOMIC IMPACT TO DATE

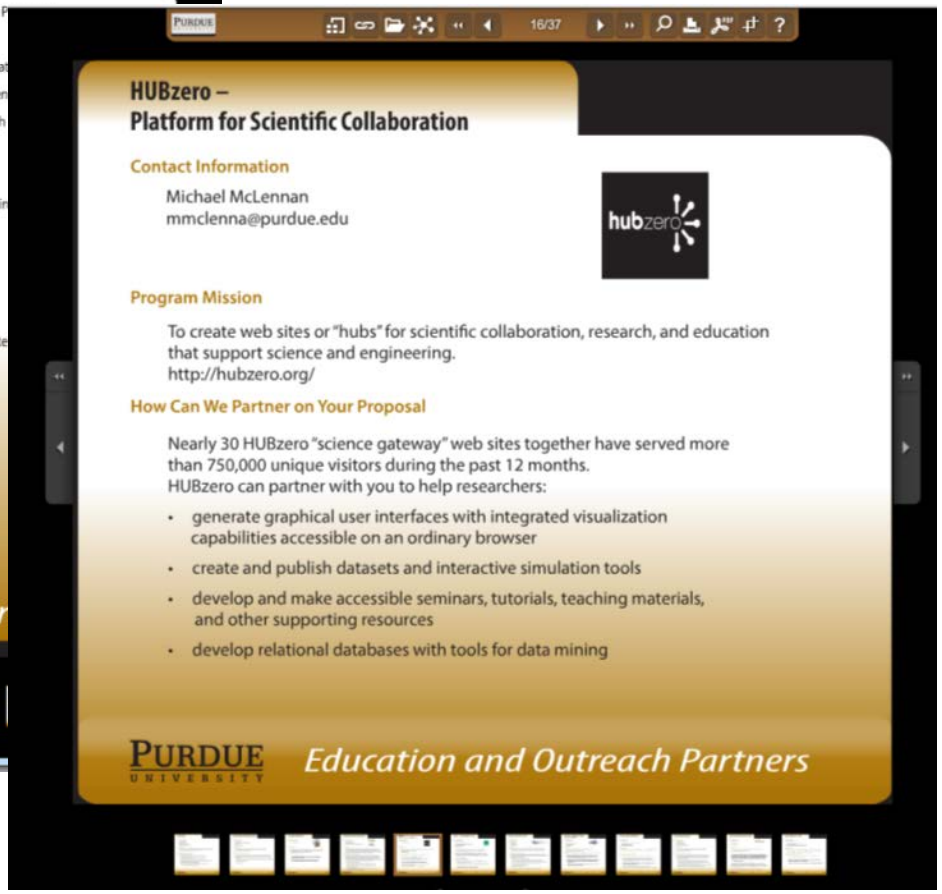
EXTERNAL SPONSORED RESARCH: $824.4 as of 2/1/2014
PRIVATE DONATIONS INVESTED: $139 million
EQUIPMENT ADDED: $34 million
LABORATORY SPACE ADDED: 147, 502 sq ft.
OFFICE, MEETING SPACE ADDED: 107,299 sq ft.

Key Online Resources

Virtual Rolodex for broader impact partners at Purdue

http://catalog.e-digitaleditions.com/i/256966





Key Online Resources

Tools for understanding broader impacts

Funding Agency Requirements for Broader Impacts

While a variety of funding agencies require researchers to address **how proposed research will benefit the nation**, the National Science Foundation (NSF) has made broader impacts a significant emphasis. The *NSF Grant Proposal Guide* now requires the project summary, narrative, and the Prior NSF Support section to contain a discussion of the broader impacts accomplished:

- through the research itself,
- through the activities that are directly related to specific research projects
- through complementary activities that are supported by the

The "societally relevant outcomes" valued by NSF include but are not

- full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM);
- improved STEM education and educator development at any level;
- increased public scientific literacy and public engagement with science and technology;
- improved well-being of individuals in society;

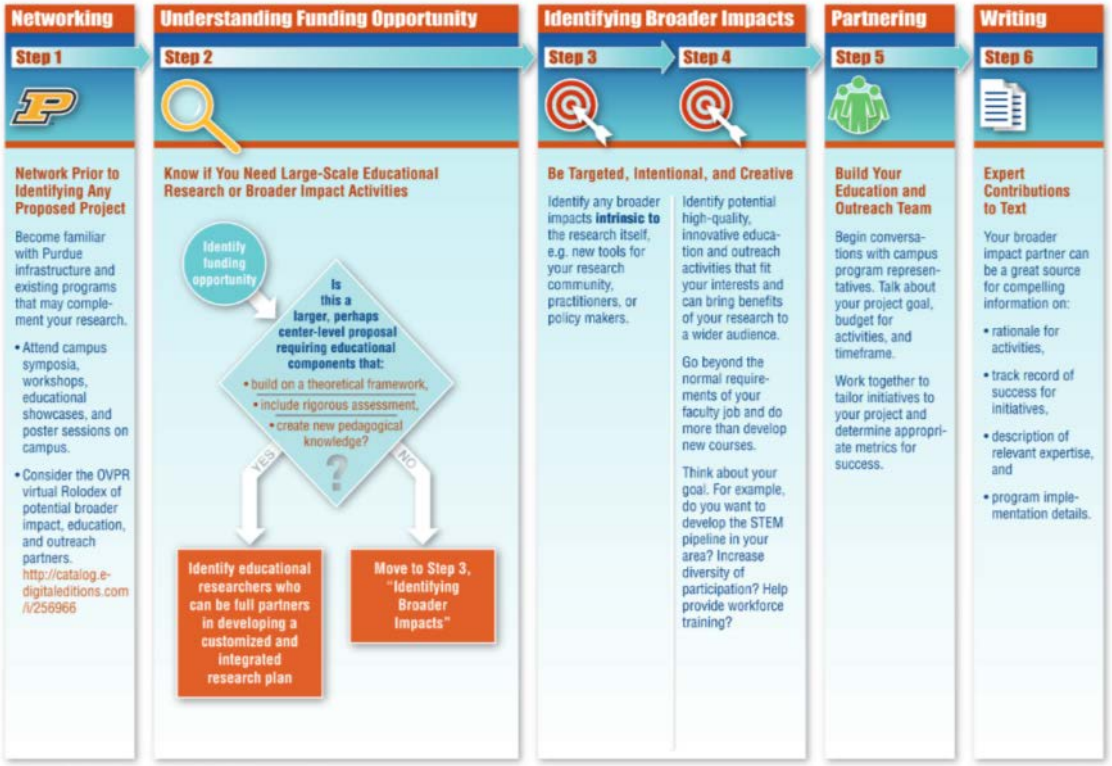
Two recommended reads from the Office of the Vice President for R

(1) *NSF Merit Review FAQs* from January 2013 http://www.ns

(2) Centers for Ocean Sciences Education Excellence (COSEE) http://www.cosee.net/files/coseenet/BI%202_0%20FAQs

For tips on building broader impact activities into your pro

Steps to Leveraging Campus Resources for Broader Impacts



Questions?

PURDUE
UNIVERSITY

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	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										
Check proposal worksheet to verify for DLRC, DP, or other DP center credit										
Write summary or abstract										

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

Research Strategy

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:**

- **Identifying novel modulators of infection by the NIH priority pathogen Microsporidia** (Aim 1). Microsporidia are emerging human pathogens whose infection mechanisms are almost completely unknown. Further, they inflict agricultural damage and are on the EPA list of waterborne microbial contaminants of concern[24,25]. Identifying anti-microsporidian therapeutics is a special challenge because they are eukaryotes. Moreover, they are obligate intracellular pathogens so they are not amenable to traditional antibiotic screens; screening for drugs to kill them requires the presence of a validated, infectible host whose immune system is homologous to mammals, such as *C. elegans*[26,27]. This screen could identify not only useful chemical research probes and compounds that kill these pathogens outright, but also those that block microbial virulence, are modified by the host for full efficacy (prodrugs), or enhance host immunity.
- **Identifying novel regulators of fat metabolism** (Aim 2). Disregulation of metabolism results in many common and expensive chronic health conditions; diabetes alone affects 24 million Americans[28]. Energy centers must receive and integrate nutritional information from multiple peripheral signals across multiple tissues and cell types to elicit appropriate behavioral and metabolic responses; screening in a whole organism is important. In particular, screening with a strain of *C. elegans* with an RNAi-sensitive nervous system will likely reveal novel energy regulators of therapeutic and research value.

PREPARING FOR A SUCCESSFUL MEETING WITH YOUR PROGRAM OFFICER

A conversation with a federal agency program officer can provide valuable insight into the funding potential of your idea. Follow these steps, says **Sally Bond**, assistant director of Research Development Services:

» Make contact early (at least several months in advance).

» Do not make a cold call. Email a one-page summary and request a phone or in-person appointment to discuss.

» Develop your one-pager using the format below. Grant writers in the Office of the Executive Vice President for Research and Partnerships can help you write this. 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 enable targeted feedback. ■

For NIH Proposals 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: One-Page Summary

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.