

Purdue Research Development Services

Sally Bond

**Director, Proposal Strategy and Development
Office of Research**

PURDUE
UNIVERSITY

Welcome, New Purdue Researchers!



- What is the Purdue process?
- How can grant writers help you?
- What resources are available?

Short Cut to Websites and Contacts



Getting Started

Overview

Getting Started

Storyline Strategy

Request Grant Writing Help

Boilerplate Text

Data Management Plans

Biomedical Research
Development

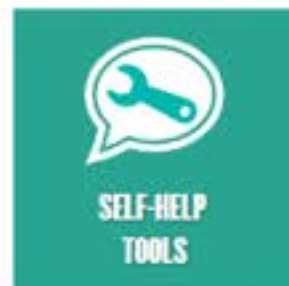
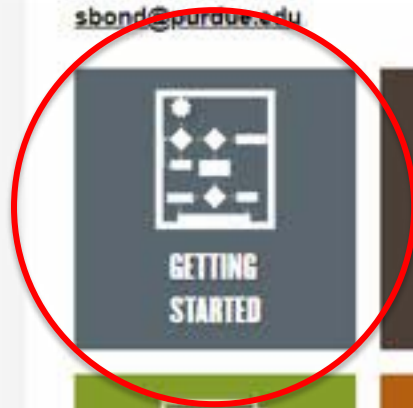
Self-Help Tools

Broader Impacts

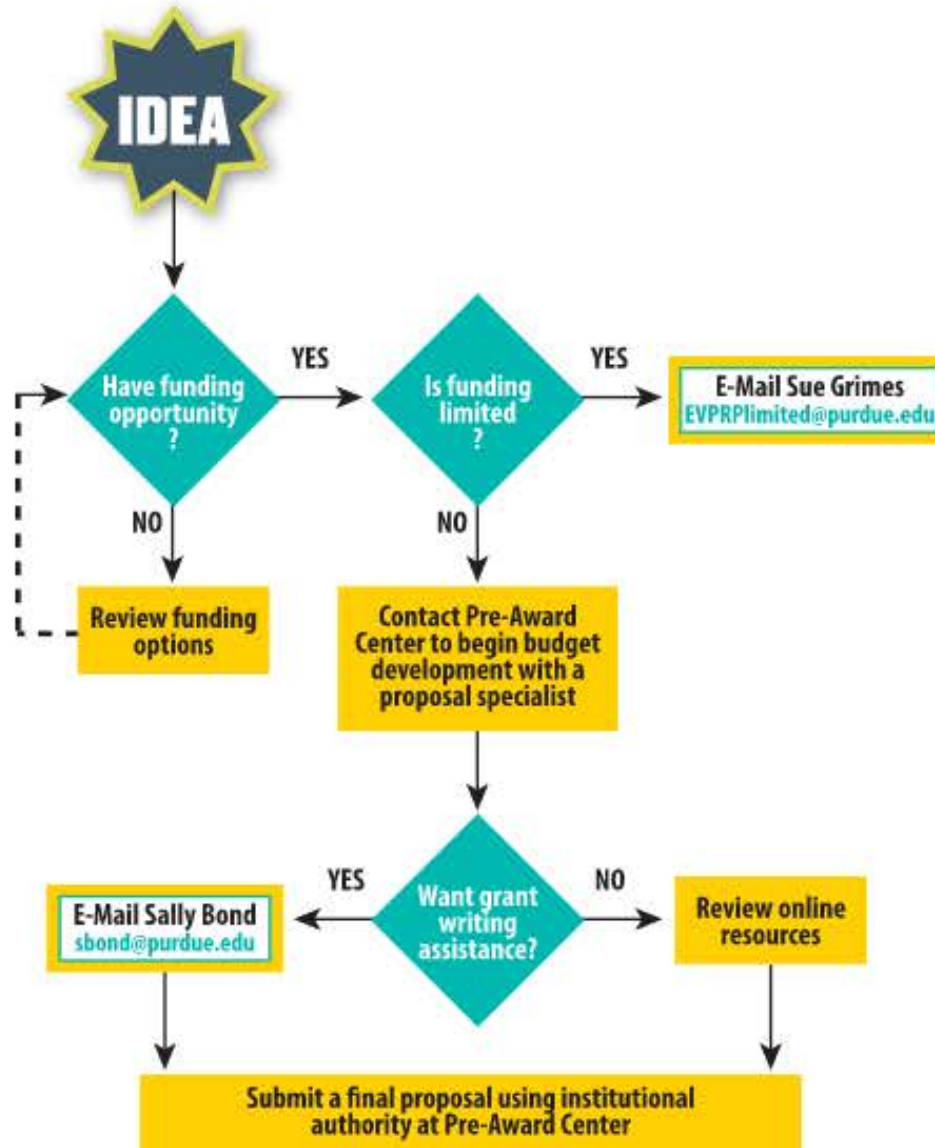
Agency Resources

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



Purdue Process Overview



Early Investigator Funding

Funding Resources

Search Tools and Alerts

Funding Newsletters

Early Investigator Funding

Mid to Senior Investigator Funding

Research Instrumentation Program

Funding Strategies

Limited Submissions

Grant Writing Support

Site Visits

Events

Cost Sharing

Research Bridge Program

FAQs

Early Investigator Funding

Click on the links below for funding opportunities for [Faculty](#) and/or [Post-Doctoral Research](#).

For funding opportunities specifically geared towards graduate students, please see the [Funding Information Search of The Graduate School Funding Database](#).

Faculty

[ACQ Mentored Scholar Grant in Applied and Clinical Research](#)

[AMRQ Career Development Grants Focused on Health Information Technology](#)

[ASHP Foundation Research Grant](#)

[Air Force Office of Scientific Research Young Investigator Research Program](#)

[American Federation for Aging Research Grants for Junior Faculty](#)

[Army Research Office Young Investigator Program](#)

[Alfred P. Sloan Foundation Sloan Research Fellows](#)

[Beckman Young Investigator Program](#)

[Blavatnik National Awards for Young Scientists \(Limited\)](#)

[Brain & Behavior Research Foundation Young Investigator Grant](#)

[Camille Dreyfus Teacher-Scholar Awards \(Limited\)](#)

[CDMRP Career Development Awards](#)

[Damon Runyon Cancer Research Foundation Innovation Award](#)

[DARPA Young Faculty Award](#)

[DOE Office of Science Early Career Research Program](#)

[Gabrielle's Angel Foundation Medical Research Awards \(Limited\)](#)

[Greenwall Foundation Greenwall Faculty Scholars Program in Bioethics \(Limited\)](#)

[Jefferson Science Fellowship](#)

[Microsoft Research Faculty Fellowships \(Limited\)](#)

[NASA Early Career Faculty](#)



Set Up Your PIVOT Account



[Funding](#)

[Profiles](#)

[Papers Invited](#)

[Funding](#)



Create your Pivot Account

You must be affiliated with an institution that subscribes to Pivot in order to create an account.

There are two ways to create an account and access Pivot. Some institutions allow you to use your institutional login credentials, or you may use your institutional email address as your user ID and create a password of your choosing.

Choose an option below. Once your account is created, you will receive a verification email.

[Use Institutional Login Credentials](#)

OR

[Use Email Address/Create Password](#)

Already have an account? [Log in here](#)



Weekly Funding Newsletter

[NIH Biology of Bladder Cancer \(R01\)](#) This FOA encourages applications that investigate the biology and underlying mechanisms of bladder cancer. Bladder cancer is a significant health problem both in the United States and globally. Fundamental knowledge of how molecular and cellular functions of the bladder are altered in cancer will aid our understanding of bladder cancer biology and contribute to the future development of new interventions. Deadline: October 5

[NIH HEAL Initiative: Interdisciplinary Team Science to Uncover the Mechanisms of Pain Relief by Medical Devices \(RM1\)](#) This funding opportunity announcement (FOA) is designed to support interdisciplinary teams of multiple PD/Pis to investigate the mechanism of action of pain relief by medical devices. The overall goal of optimizing therapeutic outcomes for FDA-approved or -cleared medical devices is expected to accomplish goals that require considerable synergy and collaboration. Applicants are encouraged to leverage appropriate multi-disciplinary expertise to develop new pain relief devices, conduct rigorous analysis, and interpretation. Teams are encouraged to consider the field of pain relief by medical devices. Deadline: October 5

[DOD-DARPA Muons for Science and Security \(MSS\)](#) This funding opportunity announcement (FOA) is designed to support the development of a directional source of muons produced at a laboratory facility for use in the detection and characterization of demonstrations of national security. The goal of this topic area is to develop a better understanding of how muons are generated and while showing a clear path to practical applications. Applicants are encouraged to investigate innovative muon systems. Specifically, the goal of this topic area is to develop a better understanding of how muons are generated and practice the existing state of muon systems.

[DOE-NETL Grid Services and Reliability Demonstration](#) The demonstration FOA will provide funding to demonstrate projects that seamlessly integrate renewable energy resources to provide grid services to the bulk power grid as well as Grid Services Design, Implementation, and Demonstration. Topic 1: Integration of Distributed Energy Resources (DER) technologies to provide grid services. The goal of this topic area is to develop a better understanding of how distributed energy resources can be integrated under very-high IBR scenarios through advancements in modeling and simulation and to develop and validate strategies and new technologies that can maintain system reliability at high levels of IBR penetration and improve reliability. Deadlines: September 1 – concept paper; September 15 – Full application

[DOE-NETL Carbon Ore Processing](#) The Carbon Ore Processing Program is focused on the conversion of coal and coal wastes into value-added products that are outside of traditional thermal and metallurgical markets. For this FOA, coal wastes are defined as the carbonaceous solid portion of waste resulting from the cleaning of coal. This FOA will support R&D across three different areas of interest (AOI), covering the entire value spectrum from high value through high volume. AOI 1 will support R&D of high value coal and coal waste derived solid carbon

****Purdue faculty and research staff: To directly receive this newsletter in your inbox, please sign up for the listserv here: <https://lists.purdue.edu/mailman/listinfo/weeklyfundingopps>. Only purdue.edu e-mail addresses will be accepted.****

Limited Submission Process

Purdue Internal Deadlines for Proposals

Download: [Limited Submission Proposal and Review Process](#)

*****NEW PROCESS FOR LIMITED SUBMISSIONS***** Purdue subscribes to InfoReady for on-line management of limited submission and internal funding competitions (<https://purdue.infoready4.com/>). Internal preproposals should be submitted using this system. In InfoReady, click on the [blue](#) Purdue University Login button and use your Purdue credentials. ***On first use, click on your name in the upper, right corner and set your Primary Organization as "Purdue WL" then select your college.***

* Preproposals are required unless otherwise stated and must be received before midnight (Eastern Time) of the due date to be eligible.

Program Name	Internal Deadline	Agency Deadline(s)	Preproposal Template
NSF Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (NSF INCLUDES)	8/28/23	10/24/23 - Network Connectors and Alliance 10/30/23 - Conferences	Template Apply
Greenwall Foundation Faculty Scholars Program in Bioethics	8/21/23	9/18/23 - LOI; 1/8/24 - Application by invite	Template Apply
University Consortium for Applied Hypersonics (UCAH) Project Call	8/21/23	9/11/23 - LOI; 11/1/23 - Proposal	Template Apply
NSF National Artificial Intelligence Research Institutes	8/21/23	10/31/23 - Preliminary proposal group 1; 2/16/24 - Full proposal group 1; 1/12/24 - Preliminary proposal group 2; 5/17/24 - Full proposal group 2	Template Apply
NSF Research Security and Integrity	8/14/23	9/8/23 - LOI; 10/30/23 - Full	Template

Grant Writing Assistance and Resources

Overview

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Grant Writing Support

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GETTING
STARTED



STORYLINE
STRATEGY



REQUEST A
GRANT WRITER



BOILERPLATE
TEXT



DATA MANAGEMENT
PLANS



BIOMEDICAL RESEARCH
DEVELOPMENT



SELF-HELP
TOOLS

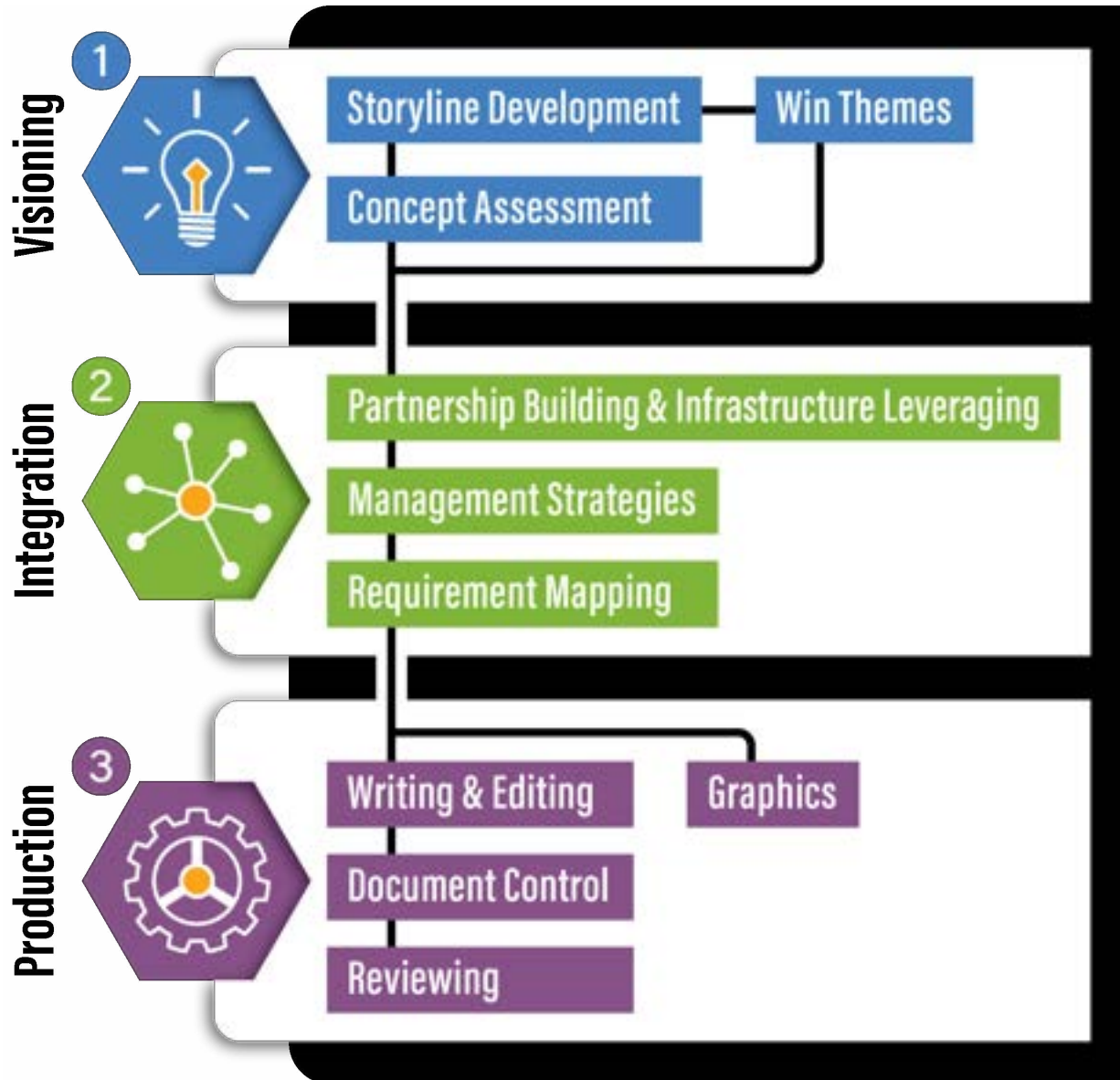


BROADER
IMPACTS



AGENCY
RESOURCES

Grant Writing Strategy



Developing a Storyline



A Good Proposal Tells a Compelling Story

- Identifies an important problem
- Provides coherence or a “north star” for your ideas
- Hooks reviewer so weaknesses are not fatal

Developing a Storyline



Logic Flow

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

Developing a Storyline



Logic Flow

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

Developing a Storyline



Sample Storylines

What exactly does a storyline look like? Access color-coded examples from funded proposals.

[Capobianco NSF IUSE Two Step Storyline Process](#)

[Huang MRI Storyline](#)

[Teegarden NIH R01 Specific Aims and Project Summary](#)

[Watts NIH R21 Storyline](#)

Biological photosynthesis has long served as an inspiration for light-harvesting technologies, and fascination with this fundamental process has driven a century-long effort to uncover its mechanistic details. Despite dramatic advances, however, our molecular-level understanding of photosynthesis remains severely limited by uncertainty over how protein structure tunes the light-harvesting properties of pigment-protein complexes (PPCs), the molecular workhorses of photosynthesis. While crystallographic methods offer invaluable atomistic data and spectroscopic experiments provide enticing glimpses of PPC exciton dynamics, the link between structure and spectroscopy is often tenuous as it relies on empirical fits to severely congested optical spectra. Such spectroscopic ambiguity translates directly into uncertainty over energy transfer and trapping mechanisms, particularly in complex systems such as the Photosystem I (PSI) and Photosystem II (PSII) core complexes. To overcome this challenge, I propose to develop a robust toolkit for determining how protein structure tunes PPC optical properties and to use these tools to determine the molecular identities and functional roles of the low-energy trap states of PSII.

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.

Storyline to Concept Paper



INFEWS/T2: Identifying Sustainability Solutions through Global-Local-Global Analysis of a Coupled Water-Agriculture-Bioenergy System

The global Food-Energy-Water (FEW) system is under increasing pressure to meet rising demands for food, energy, and water while maintaining ecosystem services provided by natural lands and waters. With growing population, rising per capita incomes, and climate change, researchers predict unprecedented resource challenges in the next 30 years. Global crop output is expected to increase by anywhere from 70% to more than 100%; global freshwater demand by 55% as one of the most fiercely contested resources; and global bioenergy demand by more than 1,000%. These challenges are interconnected—both across systems and across scales—so that addressing one system or location will inevitably cascade into others. Decision makers without the capacity to factor in these interconnections risk inadvertently pursuing unsustainable solutions and unintended consequences flowing from FEW system interventions.

Research has focused on analyzing effects within socioeconomic systems and within natural systems and is moving toward increased integration that emphasizes the role of spillover effects from one system to another. Global integrated assessment modeling research provided critical inputs to address tradeoffs between alternative sustainability solutions. However, such analyses typically omit at least one of the four systems—food security, bioenergy, water quality, and groundwater scarcity—and do not account for socioeconomic feedbacks. As a result, despite significant investments made by the integrated assessment communities at both global and regional scales, a **critical research gap** remains in our ability to assess sustainability solutions that have **both cross-system and cross-scale components**. The absence of feedback from local actions to regional, national, and global effects makes it nearly impossible to achieve a complete analysis of tradeoffs associated with alternative policy and management interventions.

We will address this knowledge gap by building an integrative framework for analysis of FEWS solutions that highlights synergies and tradeoffs resulting from multiple policy levers and thereby allows the development of more comprehensive sustainability solutions. We will begin with the analysis of individual interventions (levers) and progress to multiple interventions that reveal how policy levers interact across systems and scales for a Global to Local to Global community of practice. Our three goals are to:

Goal 1. Single-lever analysis: Establish system behavior and identify the performance of individual levers and feedbacks to the larger integrated system via cascading pathways of impacts.

Goal 2. Multiple-lever analysis: Using the integrated system, identify high-performing strategies composed of multiple levers that reveal the trade-offs, synergies, and economic costs associated with managing FEWS challenges.

Goal 3. Community of Practice: Foster development of a community of practice utilizing Global-Local-Global methods to examine integrative solutions to these FEWS challenges.

Our open-source framework will strategically build on a portfolio of internationally vetted tools we have previously authored as global models of hydrology and water quality (WBM), food systems (SIMPLE-G), bioenergy (ENVISAGE), and U.S. agro-ecology (Agro-IBIS). Our experienced, interdisciplinary team of researchers have a history of productive collaboration across areas of global economic analysis of agriculture and environmental issues, policy trade-offs, and synergies associated with sustainability challenges, hydrology, and water quality. Our novel geospatial science gateway GeofHub will provide a proven cyber platform to accelerate progress toward project milestones.

The proposed system of systems will allow us to evaluate trade-offs and synergies across the FEW system for a suite of sustainability solutions. This framework will inform local/regional decision-making about sustainability goals by developing an open source, gridded FEW modeling system. Powered by NSF-funded technologies GeoHub on HUBzero and utilize GIABBS (geospatial data building blocks), as well as the XSEDE computational backbone, the framework will allow fine-scale analysis across broad geographies. We will analyze global drivers of local sustainability stresses as well as feedbacks to national and international levels stemming from local adaptations to national/international FEWS stressors. This will deliver a more complete analysis of tradeoffs associated with different policies and pathways. Education and outreach on the GeofHub will provide spatial analysis capabilities to stakeholders and non-experts without requiring local software resources.

Method

Why Us?

Impact

Drop-in Text for Resource/Facilities



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Libraries and School of Information Studies

OFFICE OF RESEARCH AND PARTNERSHIPS

The Office of the Executive Vice President for Research and Partnerships (EVRP) supports faculty in all aspects of research, including funding access, proposal development, research integrity, corporate and foundation relations, and interdisciplinary infrastructure. Suresh Garimella, Ph.D. is the current executive vice president for research and partnerships.

[Follow](#)

Browse the *Office of Research and Partnerships* Collections:

[University General Facility Boilerplate Descriptions](#)

[University Research Core Facility Boilerplate Descriptions](#)

Reader from: Montreal, Quebec, Canada
Macromolecular Crystallography
C Nicklaus Steussy, Tim Schmidt, Purdue University Office of Research and Partnerships

Broader Impacts & Broadening Participation



Steps to an Education and Workforce Development Plan

The Best Education and Workforce Development (EWD) Plans:

- Are tailored to the specific research
- Are sustainable and scalable
- Include the right expertise
- Leverage institutional resources
- Have rationale from the literature
- Advance diversity, equity, and inclusion when possible
- Add an appropriate budget
- Do not name partners without permission

Click each step for details.

- 1** Identify EWD Gaps
- 2** Identify Interest, Track Record, and Institutional Context
- 3** Determine Audience
- 4** Identify Partners and Resources
- 5** Plan to implement and Assess
- 6** Articulate Broader Impacts

Broader Impacts Guiding Principles and Questions for National Science Foundation Proposals

The National Association for Broader Impacts (NABI) Broader Impacts Working Group has developed a guiding document for the National Science Foundation's (NSF) broader impacts (BI) criterion. The purpose of this document is to assist NSF program managers, proposal reviewers, and review panels in evaluating the BI component of NSF proposals, and to assist proposers with developing their broader impact plans. This document is intended to provide a means for consistency in the way review panels evaluate and rate proposed BI plans.

Types of Broader Impacts: According to the current NSF Merit Review Criteria published in the Grant Proposal Guidelines (see page B-2 HERE), the following BI goals may be considered:

- Full participation of women, persons with disabilities, and underrepresented minorities in STEM
- Improved STEM education and education development at any level
- Increased public scientific literacy and public engagement with science and technology
- Improved well-being of individuals in society
- Development of a vibrant, globally competitive STEM workforce
- Increased partnerships between academia, industry, and others
- Improved national security
- Increased economic competitiveness of the United States
- Enhanced infrastructure for research and education

TERMINOLOGY

- **Broader Impact (BI) Activity:** A BI activity is a planned experience, engagement, action, function, etc. that is conducted over a finite period of time for a specific purpose and with a target audience. If the target audience is undergraduate or graduate students, the activities should be in addition to national undergraduate coursework or graduate student involvement. If a proposal mentions that faculty will teach an undergraduate course or mentor graduate students, this, in itself, would not be considered a broader impact activity. Broader Impacts refers to activities that go beyond traditional faculty responsibilities.
- **Engagement:** The PI and/or project team actively and directly involves target audience participants in the proposed BI activities.
- **Evidence-based practices:** Refers to any concept, model, or strategy that is based on or informed by evidence, such as some type of research, metrics, performance, educational research, and already established best practices.
- **Goals:** Goals are the purposes toward which the activity is directed.
- **Impacts:** Beneficial within or to the target audience(s) outside the BI activities as evidenced by measurable or articulated outcomes.
- **Methods:** How the identified strategies or interventions will be implemented.
- **Outcomes:** Outcomes are the result of goals being successfully achieved. They should be measurable and measured. Outcomes demonstrate changes in awareness, knowledge, skills, attitudes,

Sample 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 Behavioral and Cognitive Sciences \(Ma 2017\)](#)

[NSF Division of Research on Learning \(Ryu 2018\)](#)

Ask for Grant Writing Help



- Any award size
- Any agency
- External proposals only
- When? Sooner is better
- Concept storylines to shop your idea
- Email sbond@purdue.edu

What do Grant Writers Do?



Overall 20-week project timeline:

	1	2	3	4	5	6	7	8	9	10
Analysis and Planning										
Develop the issues used in RFP										
Identify previously awarded proposals										
Identify RFP										
Identify for award/issue to be assigned										
Budget approval										
Proposal Overview										
1. What is the problem										
2. What are current best practices to address problem										
3. What gaps remain										
4. How we propose to address gaps										
5. Why										
6. How										
Identify proposal may become (dis)connected										
Program Officer Input										
Contract NO										
Team defined in contract										
Before award and/or planning										
Proposed Outline										
How we address outline structure										
How detailed outline of needed										
Identify graphics needed										
Partnerships										
Recruit collaborative partners										
Provide technical support, resources to partners										
Recruit advisory advisors										
Recruit advisors, board members										
Collect letters of commitment										
Management and Personnel										
Identify team management structure										
Collect resumes/ bios										
Proposal Writing and Editing										
Assign writing										
Write section assignments										
Complete RFP draft										
Project team RFP draft										
Assign individual project responsibilities										
Editing sections										
Write summary or abstract										

Red Font: Important to have agreement (and explicit text) for problem or concern prior to proposal writing.

What do Grant Writers Do?



Overall 12-week project timeline

	1	2	3	4	5	6	7	8	9	10	11	12
Analysis and Planning												
Develop the issues used in RFP												
Identify previously awarded proposals												
Identify RFP												
Identify the award/issue to be assigned												
Budget approval												
Proposal Development												
1. Write the proposal												
2. Write the abstract/summary/abstract problem												
3. Write the main text												
4. Write the proposal in abstract app.												
5. Write the proposal in abstract app.												
6. Write the proposal in abstract app.												
Identify proposal via domain/discipline(s)												
Program Office Input												
Consult PO												
Team defined in abstract												
Before formal analysis/planning												
Proposal Outline												
Develop outline without abstract												
Identify abstract outline of needed												
Identify graphics needed												
Partnerships												
Identify collaborative partners												
Identify industry partners												
Identify industry affiliates												
Identify advisors/consultants												
Collect letters of commitment												
Management and Personnel												
Identify team management structure												
Collect resumes/bios												
Proposal Writing and Editing												
Assign writing												
Write section assignments												
Complete RFP draft												
Project team RFP draft												
Assign writing section assignments												
Editing sections												
Write necessary or abstract												

Red Box: Important to have agreement (and explicit text) for problem area membership in proposal writing

Smart and Connected Communities (S&CC)

PROGRAM SOLICITATION
NSF 19-564

REPLACES DOCUMENT(S):
NSF 18-520

National Science Foundation

Directorate for Computer and Information Science and Engineering
 Division of Computer and Network Systems
 Division of Information and Intelligent Systems
 Division of Computing and Communications Foundations

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

Directorate for Engineering
 Division of Civil, Mechanical and Manufacturing Innovation
 Division of Electric, Communications and Cyber Systems

Directorate for Social, Behavioral and Economic Sciences
 Division of Behavioral and Cognitive Sciences
 Division of Social and Economic Sciences

Letter of Intent Due (abstract required) (due by 5 p.m. submitter's local time):
August 08, 2019

Request for Information Request (abstract required)
Full Proposal Deadline (due by 5 p.m. submitter's local time):
September 05, 2019

What do Grant Writers Do?



Overall 12-week project timeline.

	1	2	3	4	5	6	7	8	9	10	11	12
Analysis and Planning												
Develop discussion noted in RFP												
Identify previously successful proposals												
Identify IF												
Identify potential funding agencies												
1. Prioritize proposal												
2. Prioritize proposal based on address problem												
3. Prioritize proposal												
4. Prioritize proposal based on address problem												
Identify proposal writing team (discuss/committee)												
Program Office Input												
Contact PO												
Event defined in statement												
Before award and/or planning												
Proposal Outline												
Develop outline/outline structure												
Identify detailed outline of needed												
Identify graphics needed												
Partnerships												
Identify collaborative partners												
Identify industry partner												
Identify industry advisors												
Identify industry board members												
Identify letters of commitment												
Management and Personnel												
Identify team composition/structure												
Collect resumes/CVs												
Proposal Writing and Editing												
Assign writing												
Write sections/composition												
Complete 1 st draft												
Project team 1 st cycle												
Assign/revise sections												
Identify revisions												
Write necessary or abstract												

Note: Important to have agreement (and explicit text) for problems or uncertainties in proposal writing.

What is the problem?
 What has been done already to address the problem?
 What is the gap, and why overcome?
 How do you propose to address this gap?

Light microscopy allows direct observation of living specimens with molecular specificity (1) however the resolution and resolution of conventional light microscopes is ~250 nm (2). This technology barrier has restricted our understanding of protein function, interactions, and dynamics in the cellular context particularly at the sub-micron to nanometer length scale. Single-molecule imaging technology (SMIT) or PALM/STEDM: This technology allows direct observation of living specimens in real-time at the sub-micron to nanometer length scale.

Research: SMIT enables high-resolution imaging of proteins in cells to be from being a standard tool to biological research with practical usefulness largely limited due to:

- **Slow speed:** Traditional SMIT systems take minutes to hours to acquire all images, whereas single-molecule imaging requires less than a second (less than 10).
- **Limited to 2D and slow cameras:** Many live-cell processes happen deep in the cellular volume as well as in 3D cellular samples, which cannot be resolved with conventional SMIT (3).
- **Phototoxicity:** Traditional SMIT requires laser intensity in the range of 10^4 – 10^6 W/cm² generating large input to cellular metabolism and therefore free radical species damaging cells and tissues (4).
- **Strong reliance on user's expertise:** SMIT captures abundant but complex proteins from primary cell samples requiring significant and requires extensive user expertise. Data analysis and visualization requires computational expertise and is time-consuming (5). This lack of an autonomous approach severely restricts the number of researchers and the number of projects that can be performed.

Smart and Connected Communities (S&CC)

PROGRAM SOLICITATION
NSF 19-564

REPLACES DOCUMENT(S):
NSF 18-520

National Science Foundation
 Directorate for Computer and Information Science and Engineering
 Division of Computer and Network Systems
 Division of Information and Intelligent Systems
 Division of Computing and Communications Foundations

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

Directorate for Engineering
 Division of Civil, Mechanical and Manufacturing Innovation
 Division of Electrical, Communications and Cyber Systems

Directorate for Social, Behavioral and Economic Sciences
 Division of Behavioral and Cognitive Sciences
 Division of Social and Economic Sciences

Letter of Intent (due Friday) (optional) (due by 5 p.m. submitter's local time):
 August 09, 2019

Required by Integration Research Board (due by 5 p.m. submitter's local time):
 August 09, 2019

Final Proposal (due Friday) (due by 5 p.m. submitter's local time):
 September 02, 2019

What do Grant Writers Do?



Overall 20-week project timeline:

	1	2	3	4	5	6	7	8	9	10
Analysis and Planning										
Define key issues and a RFP										
Identify previously awarded proposals										
Identify if										
Identify proposal role from (dis)advantages										
Program Office Input										
Contact PO										
Team defined as complete										
Before formal analysis/planning										
Preproposal Outline										
Oversee outline creation/revision										
Identify proposal needed										
Partnerships										
Secure collaborative partners										
Provide informed project description to partners										
Secure advisory affiliates										
Secure advisory board members										
Collect letters of commitment										
Management and Personnel										
Identify team composition/structure										
Collect resumes/ CVs										
Preproposal Writing and Editing										
Assign writing										
Write section copy/outline										
Complete final draft										
Project team final review										
Assign review project approach										
Editing/revisions										
Write necessary or whatnot										

Note: Important to have agreement reed explicit text for problem area re: priority in proposal writing.

What is the problem?
What key issues are likely to address that problem?
What is the gap, and why necessary?
How do you propose to address this gap?

Light microscopy allows direct observation of living specimens with molecular specificity [1]. However, the resolution of conventional light microscopes is ~200 nm [2]. This resolution barrier has restricted our understanding of protein functions, interactions, and dynamics in the cellular environment at the sub-micron to nanometer length scale. High-resolution microscopy techniques are **FRAP/STED**. They provide the fundamental tool and allow visualization of biochemical processes with precision and commercial availability [3,4] to allow for being a standard tool in biochemical research with practical overheads currently limited due to:

- **Slow speed**. Traditional STED systems take minutes to hours to acquire all images, whereas most cellular events occur at the second (time scale) [5].
- **Limited to 2D and slow operation**. Many important processes happen deep in the cellular volume as well as in 3D cellular samples, which cannot be resolved with conventional STED [6].
- **Phototoxicity**. Traditional STED requires laser intensity in the range of 10^{12} W/cm² resulting large input into electron excitations and therefore free radical species damaging cells and tissues [7].
- **Strong influence of laser's properties**. STED systems optimized for resolution suffer from problems with system switching behavior and require extensive laser sequences. Data analysis and visualization demands computational expertise and is time consuming [8]. This lack of an autonomous approach, requires and complicates various practical details of imaging, such as camera timing, sampling rates,

Smart and Connected Communities (S&CC)

PROGRAM SOLICITATION

NSF 18-564

REPLACES DOCUMENT(S):

NSF 18-520

National Science Foundation
 Directorate for Computer and Information Science and Engineering
 Division of Computer and Network Systems
 Division of Information and Intelligent Systems
 Division of Computing and Communications Foundations

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

Directorate for Engineering
 Division of Civil, Architectural and Manufacturing Systems
 Division of Electric, Communications and Cyber Systems

Directorate for Social, Behavioral and Economic Sciences
 Division of Behavioral and Cognitive Sciences
 Division of Social and Economic Sciences

Letter of Intent Due (submit completed) due by 5 p.m. submitter's local time

August 06, 2018

Request for Information/Research Grant Materials

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

November 06, 2019

Writing (proposals) 20% continues. Light-speed proposals with speed options. We will provide you and dynamics in a

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 booklet 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 developmentinfo 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 "funding," 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 1:** 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 your findings.**
- **Summarize impact of your success.**

PURDUE
 UNIVERSITY

Office of the Executive Vice President
 for Research and Partnerships

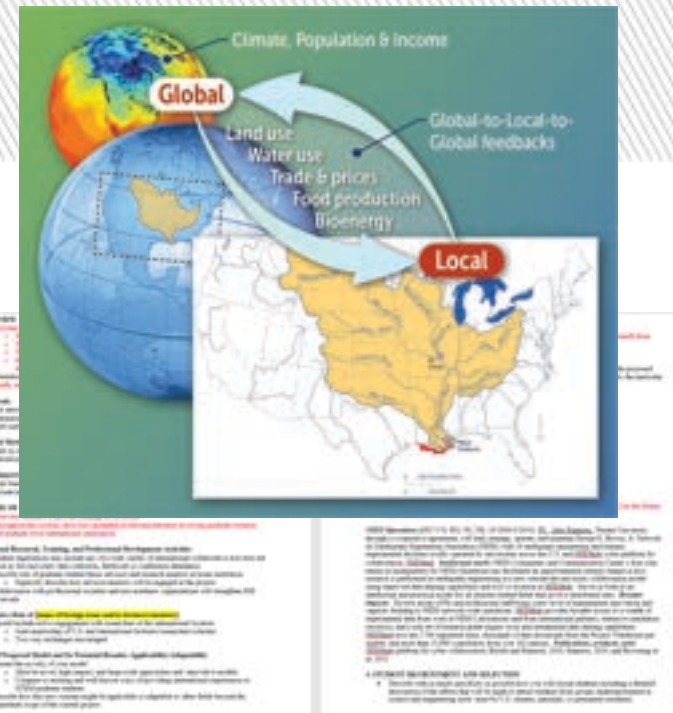
What do Grant Writers Do?



Overall 12-week project timeline:

	1	2	3	4	5	6	7	8	9	10	11	12
Analysis and Planning												
- Determine the issues and a RFP												
- Identify potential research proposals												
- Identify the award/career to be assigned												
- Budget creation												
- Proposal Overview												
1. What is the problem?												
2. What has already been done to address problem?												
3. What you want?												
4. How you propose to address gap?												
- Identify proposal title (format: Department)												
Program Officer Input												
- Contact PO												
- Team defined and meeting												
- Review formal and/or informal												
Proposal Overview												
- Clear your values within selection												
- Must identify outline of needed												
- Identify projects needed												
Partnerships												
- Review collaborative partners												
- Faculty, industry partner, foundation or partner												
- Review advisory officers												
- Review advisors, board members												
- Call/Contact letters of commitment												
Management and Personnel												
- Identify team component structure												
- Contact/Interviews												
Proposal Writing and Editing												
- Assign writing												
- Write section/complete												
- Complete 1st draft												
- Project team 1st edit												
- Also include current appointment												
- Editing overview												
- Write necessary or abstract												

Note: Important to have agreement (and explicit text) for problem or research topic in proposal writing.



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

Light microscopy allows direct observation of living specimens with molecular specificity [1], however the diffraction and resolution of conventional light microscopes is ~200 nm [2]. This technology barrier has restricted our understanding of protein functions, interactions, and dynamics in the cellular environment at the sub-micron to nanometer length scale. High-resolution, real-time, molecular imaging in vivo is essential to understand the fundamental and new cellular mechanisms in health and disease.

Research: With custom-built and commercially available TEMs to tell her from being a standard cell biological research with practical usefulness, tempo limited due to:

- **Slow speed:** Traditional TEMs systems take minutes to hours to acquire an image, whereas these systems require less than a second (less than 10)
- **Limited to 2D and slow cameras:** Many important processes happen deep in the cellular volume in 3D. Serial cameras, which cannot be resolved with conventional TEMs [3].
- **Phototoxicity:** Traditional TEMs require large intensity in the range of 10^{15} photons/cm² generating large input rate electron populations and therefore free radical species damaging cells and tissues [4].
- **Strong reliance on user's expertise:** TEMs require advanced but novice operators from probes with custom matching hardware and requires extensive user expertise. Data analysis and visualization requires computational expertise and is time consuming [5]. The lack of an autonomous approach, hardware and software solutions, camera, probe, and data analysis software, are currently limiting progress.

Smart and Connected Communities (S&CC)

Using precision 3D cameras, light-sheet microscopes with speed optics, they will provide new and dynamic data

PROGRAM SOLICITATION
NSF 19-564

REPLACES DOCUMENT(S):
NSF 18-520

National Science Foundation

Directorate for Computer and Information Science and Engineering
 Division of Computer and Network Systems
 Division of Information and Intelligent Systems
 Division of Computing and Communications Foundations

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

Directorate for Engineering
 Division of Civil, Mechanical and Manufacturing Innovation
 Division of Electric, Communications and Cyber Systems

Directorate for Social, Behavioral and Economic Sciences
 Division of Behavioral and Cognitive Sciences
 Division of Social and Economic Sciences

Letter of Intent Due (submit completed) due by 5 p.m. submitter's local time:
August 16, 2019

Request for Information Request Board Process
 Full Proposal Deadlines due by 5 p.m. submitter's local time:
September 16, 2019

- ### 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 sketch 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 dschopar@purdue.edu to request help.
 - Why a one-pager?** Distilling your idea 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 assist 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 1:** 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 of methodology.**
 - Summarize impact of your success.**

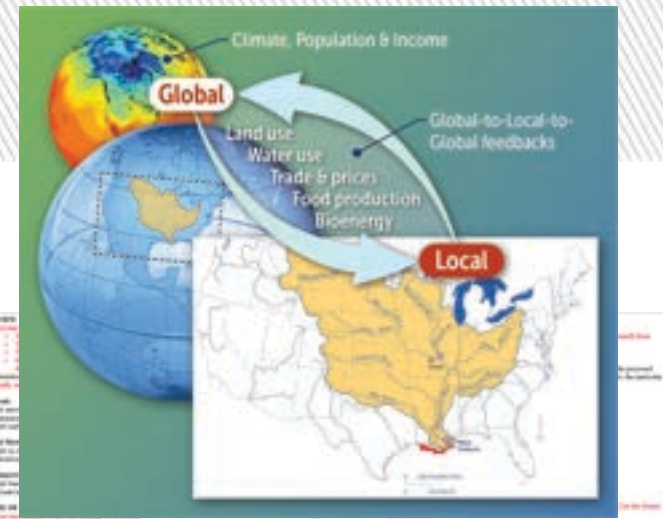
What do Grant Writers Do?



Overall 12-week project timeline

	1	2	3	4	5	6	7	8	9	10	11	12
Analysis and Planning												
Define the issues and a RFP												
Identify potential research proposals												
Identify the award/costs to be assigned												
Budget approval												
Proposal Overview												
1. What is the problem?												
2. What has been done to address the problem?												
3. What you want?												
4. How you propose to address gaps?												
Identify potential research investigators												
Program Officer Input												
Contact PO												
Team defined and meeting												
Review formal and/or planning												
Proposed Outline												
How you define outline structure												
Have identified outline of needed												
Identify graphics needed												
Partnerships												
Identify collaborative partners												
Identify funding partner, foundation or partner												
Identify industry affiliates												
Identify advisors, board members												
Identify letters of commitment												
Management and Personnel												
Identify team composition/structure												
Identify team members												
Proposal Writing and Editing												
Assign writing												
Write section composition												
Complete 1st draft												
Project review 1st draft												
Also include project approval												
Editing assistance												
Write necessary or abstract												

Note: Important to have agreement (and explicit text) for problem area membership in proposal writing.



4. CONCLUSIONS

4.1 Summary

4.2 Recommendations

4.3 Acknowledgments

4.4 References

4.5 Appendixes

4.6 Glossary

4.7 Other

4.8 Other

4.9 Other

4.10 Other

4.11 Other

4.12 Other

4.13 Other

4.14 Other

4.15 Other

4.16 Other

4.17 Other

4.18 Other

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4.45 Other

4.46 Other

4.47 Other

4.48 Other

4.49 Other

4.50 Other

What is the problem?

What has been done to address the problem?

What do you want to address this gap?

How do you propose to address this gap?

- Light microscopy allows direct observation of living specimens with molecular specificity [1]. However, the diffraction and resolution of conventional light microscopes is ~200 nm [2]. This resolution barrier has restricted our understanding of protein functions, interactions, and dynamics in the cellular environment at the sub-micron to nanometer length scale. High-resolution imaging techniques, such as PALM/STORM, have overcome this fundamental limit and allow visualization of biological processes with nanometer-scale resolution.
- However, both custom-built and commercially available STORMs suffer from being a laboratory-only instrument, research with practical usefulness, severely limited data rate.
- Slow speed.** Traditional STORM systems take minutes to hours to record a single field of view (FOV) image [3]. This is not suitable for live-cell imaging.
- Limited FOV and slow cameras.** Many STORM systems use large area detectors, which cannot be mounted with high-speed cameras.
- Phototoxicity.** Traditional STORM systems use high-power lasers to excite fluorophores, which can be toxic to cells and limit the number of frames that can be recorded.
- Strong reliance on user's expertise.** STORM systems require extensive training and require extensive technical expertise and a high level of maintenance.



Smart and Connected Communities

PROGRAM SOLICITATION
NSF 19-564

REPLACES DOCUMENT(S):
NSF 18-520

National Science Foundation

Directorate for Computer and Information Science and Engineering
Directorate for Computer and Information Science and Engineering
Division of Information and Intelligent Systems
Division of Computing and Communications Foundations

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

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Division of Electric, Communications and Cyber Systems

Directorate for Social, Behavioral and Economic Sciences
Division of Behavioral and Cognitive Sciences
Division of Social and Economic Sciences

Letter of Intent Due (submit completed) due by 5 p.m. submitter's local time:
August 16, 2019

Request for Information Research Grant Proposals
Full Proposal Deadlines due by 5 p.m. submitter's local time:
November 15, 2019

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- End with paragraph on expected outcomes.**

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- Start with storyline:**
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 - 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 of methodology.**
- Summarize impact of your success.**

What do Grant Writers Do?



	1	2	3	4	5	6	7	8	9	10
Overall 10-week project timeline										
Analysis and Planning	Identify the owner and user of RFP									
	Identify previously awarded proposals									
Identify the award team to assign budget approval										
Writing Overview	Write the proposal									
	Write the abstract/lead-in or address problem									
	Write the proposal									
Identify proposal and business requirements										
Program Officer Input										
Contact PO										
Team abstract on opening										
Before formal writing/planning										
Proposed Outline										
Develop outline without selection										
Have detailed outline of needed items/proposals ready										
Partnerships										
Recruit collaborative partners										
Provide letters of support, feedback on abstract										
Recruit advisory board members										
Collect letters of commitment										
Management and Personnel										
Identify team support structure										
Collect resumes/CVs										
Proposed Writing and Editing										
Assign writing										
Write abstract/cover letter										
Complete 1st draft										
Project team 1st edit										
Assign writing responsibilities										
Editing strategy										
Write necessary or relevant										

Note: Important to have agreement (and explicit text) for problem area responsibility in proposal writing.



1. Introduction

2. Objectives

3. Methodology

4. Results

5. Discussion

6. Conclusion

7. References

8. Appendix

9. Glossary

10. Acknowledgments

11. Contact Information

- What is the problem?
- What has been done already to address this problem?
- What is the gap, and why is it important?
- How do you propose to address this gap?
- Light microscopy allows direct observation of living specimens with molecular specificity [1]. However, the resolution and sensitivity of conventional light microscopes is ~200 nm [2]. This resolution barrier has restricted our understanding of protein function, interactions, and dynamics in the cellular environment [3].
- Fluorescence microscopy [4-6] and super-resolution microscopy [7, 8] have enabled us to visualize molecular events in live cells. However, these techniques are limited by their resolution and sensitivity [9].
- Recent developments in quantum optics and nonlinear optics have opened new pathways for optical microscopy [10, 11]. Super-resolution microscopy [12-15] and quantum microscopy [16, 17] have enabled us to visualize molecular events with sub-diffraction limited resolution and high sensitivity [18, 19].



Quantum microscopy [10, 11] has opened new pathways for optical microscopy [10, 11]. Super-resolution microscopy [12-15] and quantum microscopy [16, 17] have enabled us to visualize molecular events with sub-diffraction limited resolution and high sensitivity [18, 19].

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NSF 18-520

National Science Foundation

Directorate for Computer and Information Science and Engineering

Directorate for Education and Human Resources

Directorate for Engineering

Directorate for Social, Behavioral and Economic Sciences

Directorate for Biological Sciences

Directorate for Physical Sciences, Mathematics and Computer Science

Directorate for Research and Learning

Directorate for Science, Education and Public Policy

Directorate for Special Programs

Directorate for International Research and Partnerships

	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered
Round 1, July 1	Requested	Delivered	Delivered

- ### 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.

Next Step? Sign up for Workshops

Overview

Funding

Limited Submissions

Grant Writing Support

Site Visits

Events

Cost Sharing

Research Bridge Program

FAQs

Funding and Grant Writing

The goal of the EVPRP Research Development staff is to assist faculty in the development of research and education proposals. **EVPRP staff** provide a broad range of services and resources related to funding and grantsmanship. Below are some of the ways we can assist.



Funding Resources

The funding page provides information on internal, external, seed, and early investigator funding opportunities. Links to helpful funding search tools and e-mail alerts can also be found here.



Limited Submissions

Check here for details on internal competitions including deadlines, templates and submission guidelines.



Grant Writing Support

Research Development staff can provide assistance with both large and small proposals. This page explains our services and provides links to other useful proposal preparation resources.



Site Visits

Our staff can assist with the logistics and coordination of site visits allowing the research team to focus on their science and team. Follow this link to find out more about these services.



Events

The events page provides information on upcoming grantsmanship workshops and events including dates, times, and registration information. Presentations from previous events can also be accessed from this site.



Other Useful Links

Our *Guide to the Grants Process at Purdue University* and information on potential education and outreach partners are available here as well as links to other grantsmanship resources.



Workshops and Training

Grantsmanship Events

A series of grantsmanship workshops are hosted throughout the year by the Office of the Executive Vice President for Research and Partnerships. Many of these workshops are particularly useful for new faculty or those new to the research process at Purdue.

For further information and to register for an upcoming workshop, click on the link below. Please note that registration becomes available approximately one month prior to the event, at which point the workshop title becomes a hyperlink.

When possible, an archive of each presentation is available from the **Past Events** list below.

Upcoming Event List

Title	Date, Time & Location	Description and Registration
Finding Funding, Limited Submissions, and Proposal Submission	Tuesday, September 5, 2023 1:30 - 3:00 p.m. STEW 202	Overview of how to locate funding opportunities from federal, foundation and industrial sponsors. Summary of the limited submission process. Working with Pre-award for proposal submissions.
NIH 101	Thursday, September 28, 2023 1:30 - 3:00 p.m. STEW 300	This session provides an overview of the NIH and teaches tips for finding the best NIH Institute/Center for your research interests as well as strategies for successful proposals.
NIH 102	Tuesday, October 3, 2023 1:30 - 3:00 p.m. STEW 301	This session provides additional guidance on tools and resources available to help you succeed with NIH proposals. This session is a follow-up to NIH 101 but participation in 101 is not necessary for attendance at this session.
Successful Grant Writing Strategies	Wednesday, October 4, 2023 1:30 - 3:00 p.m. STEW 234ABC	Learn best practices for proposal writing and what services are available to assist you in these efforts.
Understanding Proposal Budgets	Wednesday, October 25, 2023 1:30 - 3:00 p.m. STEW 300	This session provides an overview of how Sponsored Program Services (SPS) Pre-award office can assist you in developing a comprehensive budget for your proposal. Also, what is cost share and when/how do you include it in a proposal?





Questions?