



# I'VE PUBLISHED MY DATA, NOW WHAT?

## FUNDING YOUR NEXT RESEARCH PROJECT

ELAINE L. LEE, PHD

ASSISTANT PROFESSOR, MEDICAL SCIENCES & EDUCATION

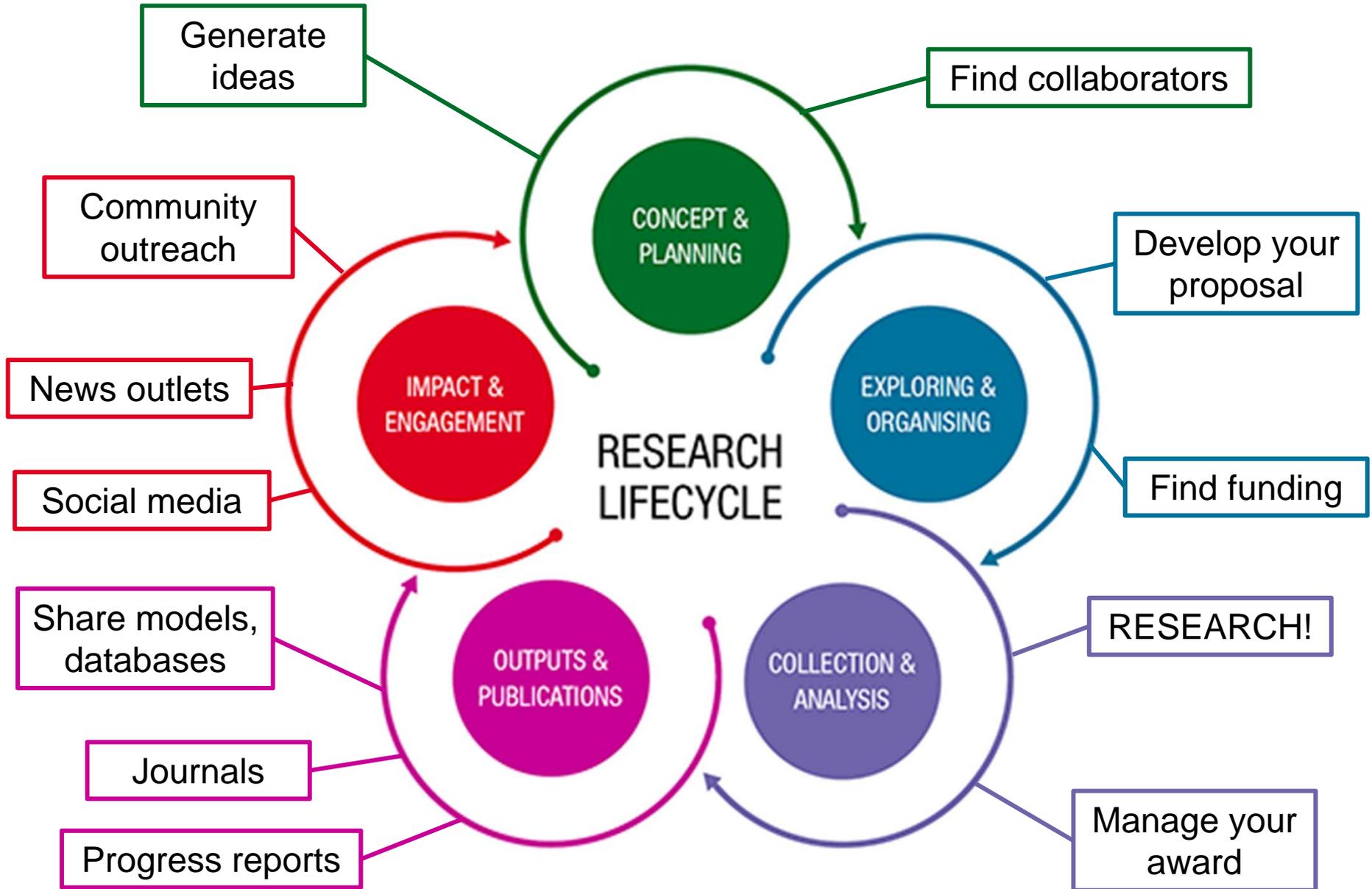
GRANT STRATEGIST, PROPOSAL DEVELOPMENT

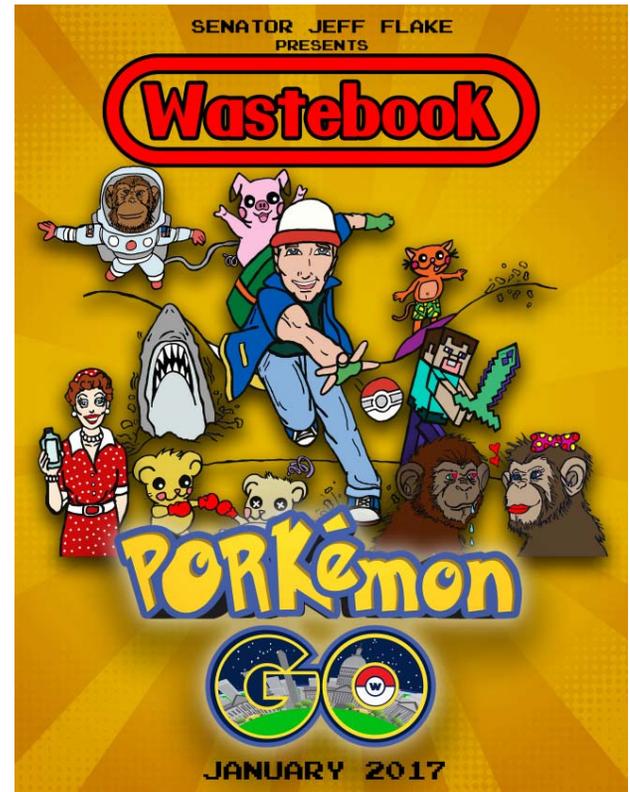
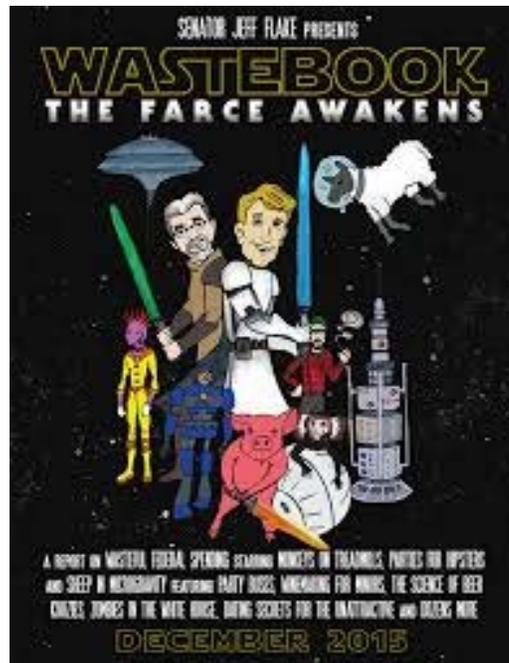
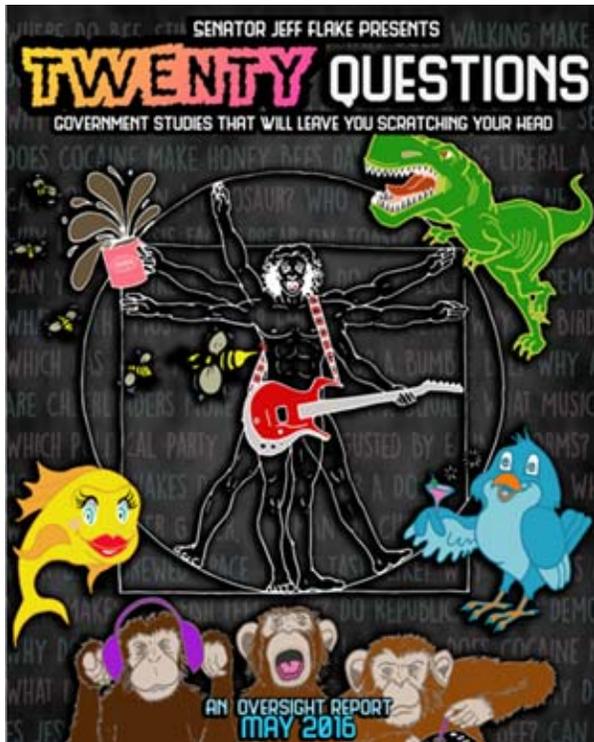
TUESDAY, SEPTEMBER 25, 2018

GRANTS ARE THE *END* OF THE  
PROCESS, *NOT THE BEGINNING.*



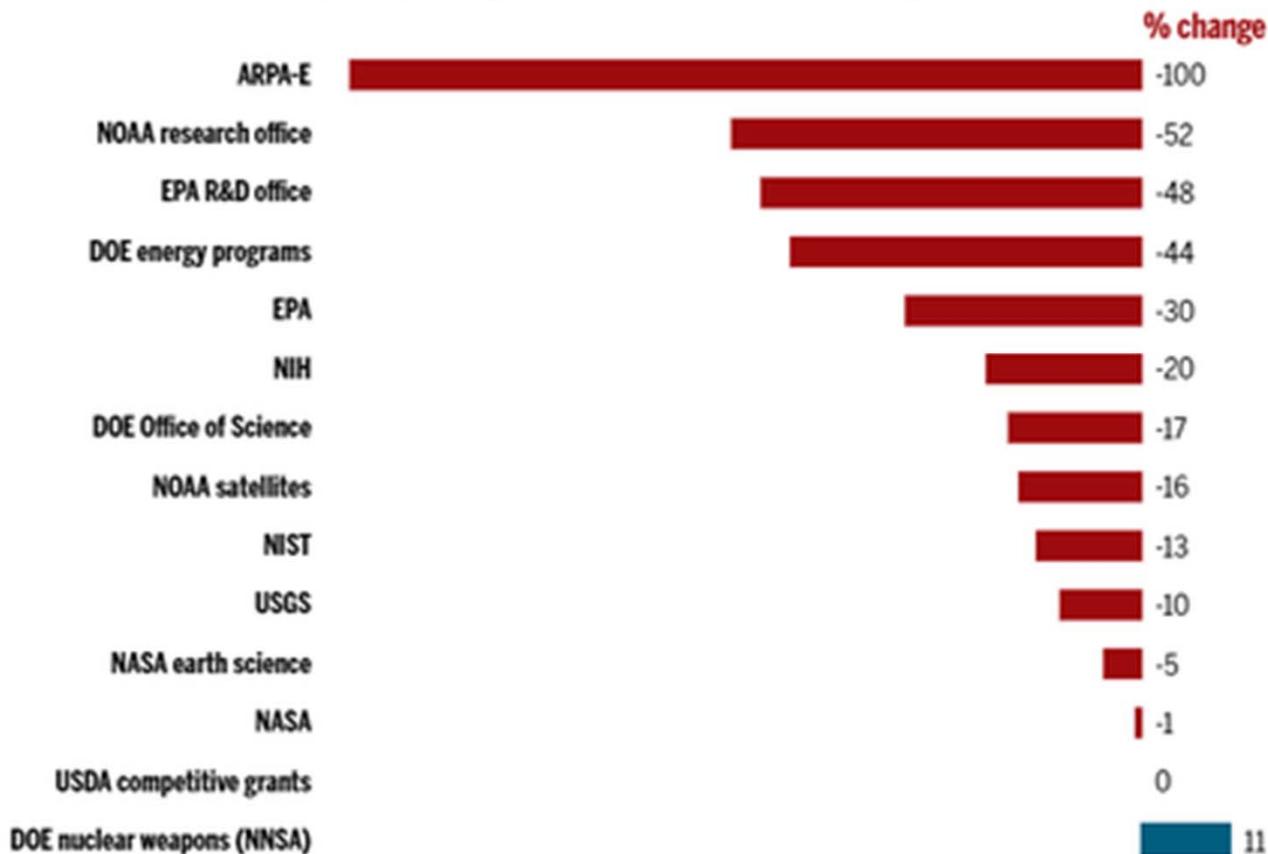
# RESEARCH LIFE CYCLE





## The ax falls on research

Numerous federal science programs would see major cuts from 2016 levels under President Donald Trump's 2018 budget request, with the National Institutes of Health (NIH) getting a \$6 billion, 20% cut, a preliminary analysis suggests. Nuclear weapons funding would surge.



Graph: David Malachuk/Science

Data: Matt Hourihan, AAAS R&D Budget and Policy Program

SHARE



3K



43



206



President Donald J. Trump

Gage Skidmore/Flickr (CC BY SA)

## A grim budget day for U.S. science: analysis and reaction to Trump's plan

By Science News Staff | Mar. 16, 2017, 5:00 PM

## Trump's budget is everything scientists have been fearing

The outline cuts at least \$7 billion for research on climate change, diseases, and energy.

Updated by Brian Resnick | @B\_resnick | brian@vox.com | Mar 16, 2017, 11:57am EDT

## NIH cuts could mean no new grants in 2018

The biomedical research community is reacting with shock and administration's proposed 18% cut to the budget of the National Institutes of Health.



TRUMP TESTIFIES ON TRUMP WIRETAPPING CLAIMS, RUSSIA | GORSUCH SPEAKS AT CONFIRMATION HEARING GET ALERTS

WS

SECTIONS

NIGHTLY NEWS MSNBC MEET THE PRESS DATELINE TODAY



NEWS

HEALTH CARE DIET & FITNESS MENTAL HEALTH MEN'S HEALTH WOMEN'S HEALTH

## Trump Budget Cuts to Scientific, Medical Research Would Have 'Devastating' Effect: Experts

by MAGGIE FOX

President Donald Trump's plan to cut billions of dollars in funding to medical and scientific research agencies would cost the country countless jobs, stall medical advances and threaten America's status as the world leader in science and technology.

From the Web

Sponsored Links



A microscopic view of algae colonies

## Scientists Brace for a Lost Generation in American Research

Private funding isn't enough to offset the president's proposed budget cuts, they say.

ADRIENNE LAFRANCE | MAR 16, 2017 | SCIENCE

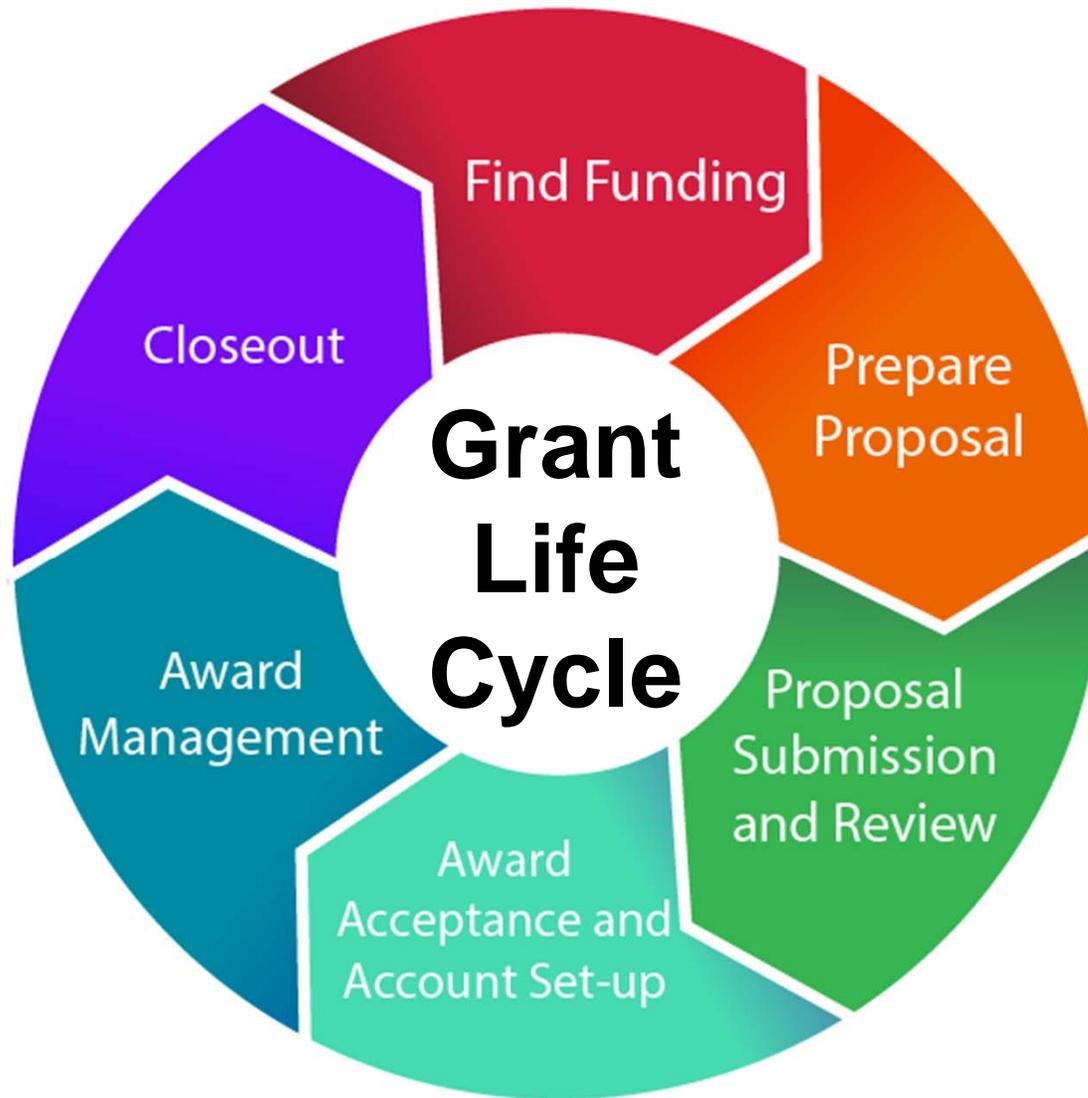


# PROPOSAL DEVELOPMENT

Established to assist faculty and principal investigators in developing competitive proposals

- **technical and skilled administrative support when developing grant and contract proposals** for external funding. PD supports researchers by leading development of administrative components of the proposal preparation process **so you can focus on the science.**
- **2017:** Expanded to provide **support in crafting clear, compelling scientific narratives**, through 1:1 support for early-career investigators and non-Native English speaking faculty

# THE GRANT PROCESS



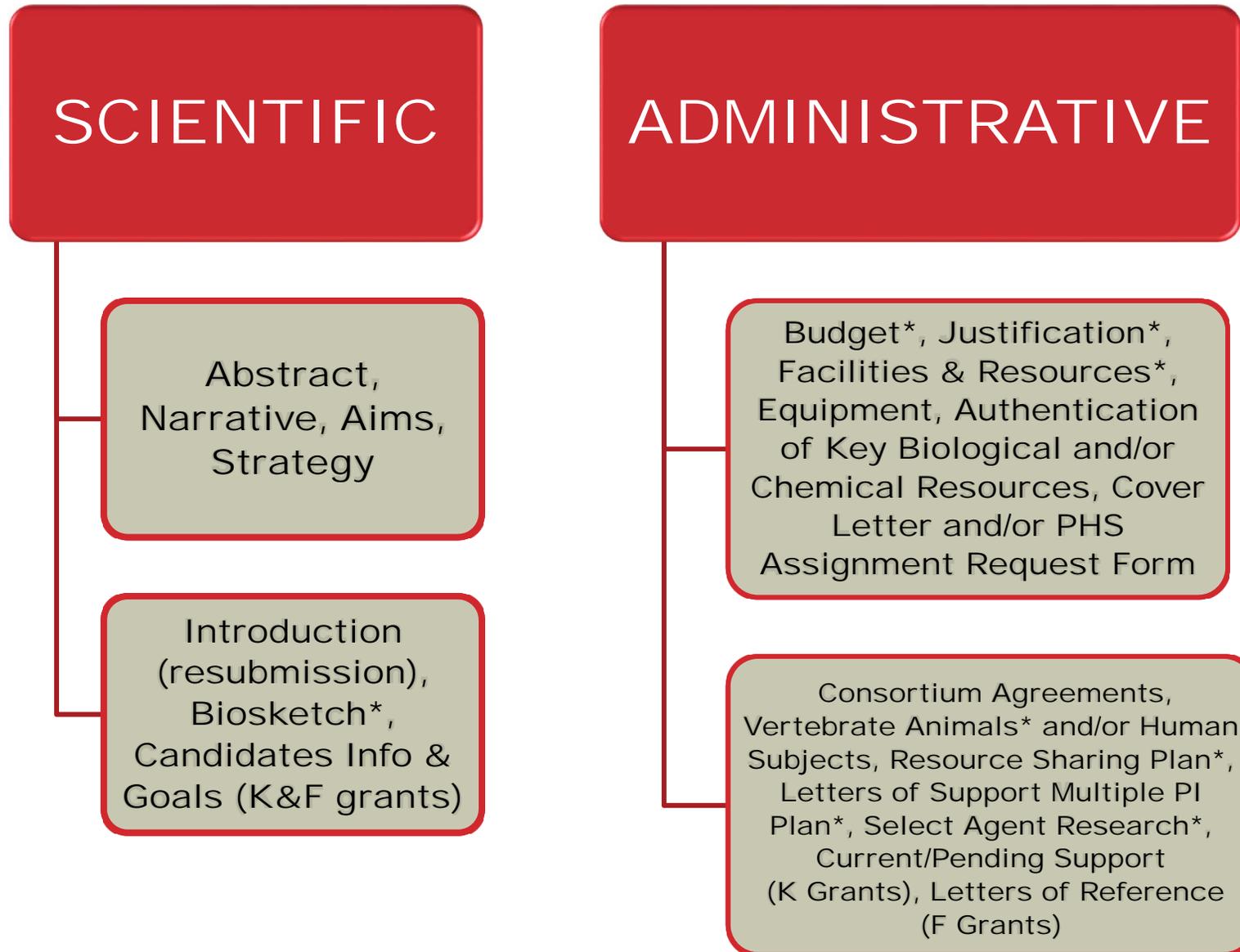
# IDENTIFY FUNDING OPPORTUNITY

## PD can help you:

- Find funding (fit & eligibility)
- Develop budgets
- Collect institutional approvals
- Identify collaborators & subcontracts
- Navigate grant application systems
- Represent you during pre-award (OSP/Sponsor)



# GRANT COMPONENTS



# INTERNAL APPROVALS & DOCUMENTATION

**PSF**  
(PROPOSAL  
SUMMARY  
FORM)

- VERIFIES:
- Applicant Information
  - Predicted Budget
  - IRB/IACUC Compliance Status

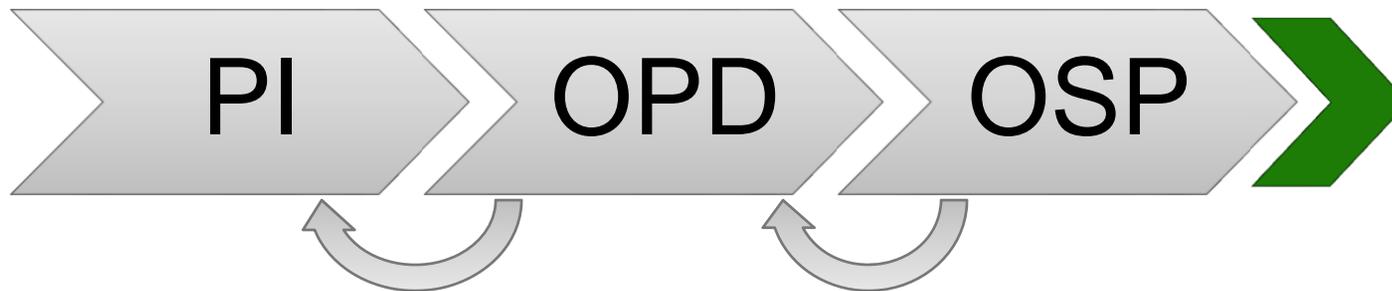
**APPROVALS  
NEEDED**

- CONFIRMS:
- If Cost Share is Needed
  - If F&A Waiver is Needed
  - If PI Status is Needed

**WHY IT  
MATTERS**

- IDENTIFIES:
- Academic Reporting
  - Components Needed for Application
  - F&A Calculation

# FINAL SUBMISSION



Notify Proposal Development of your intent to submit **ONE MONTH** prior to deadline.

## **OSP DEADLINES (in business days):**

- 10** PSF, Budget, justification, biosketch (PI and collaborators)
- 5** All final administrative components
- 3** Final proposal due

Would someone who is  
broadly scientifically trained  
(but not necessarily in your field)  
believe your idea is *fundable*?



# GRANT STRATEGIST

- **Provide perspective on how your narrative is presented**

- PhD in Biomedical Engineering

Past research: cardiovascular systems, tissue engineering, stem cells, mechanotransduction, drug delivery

- Scientific Publications at The Texas Heart Institute

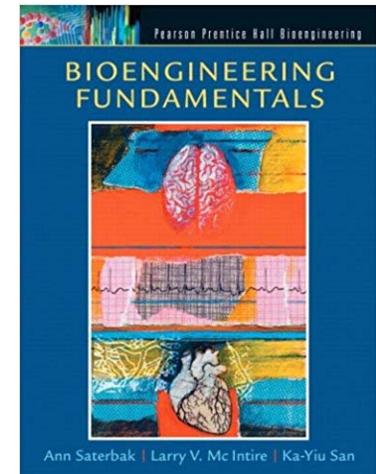
- Technical Editor of *Bioengineering Fundamentals*

- Past individual awards

- AHA Predoctoral — 18% rank
- AHA Predoctoral Competitive Renewal — 12% rank
- NIH NHLBI NRSA F32 — 6% rank

- Success at BUSM (since Feb 2017)

- Aided bringing in \$25.5 million (\$5.9 million pending)
- Includes U2C, R, K, and foundation grants



# MISSION AND ROLE

- Serve as a coach in the process of proposal development
- Guide PIs through their own revisions of their proposals
- Educate PIs on achieving effective presentation that conveys clarity of thought
- Focus on language, logic, flow, and organization
- Attention is given to scientific content/experimental design, but should be viewed as complementary to expertise of PI's peers, colleagues, and mentors.

# EXTERNAL FACTORS

- Grant writers do not make policy → No control over funder's long-range visions.
- Ineffective “selling” presentation from reviewers to committee
- Timing and positioning is not right (e.g., economic conditions)
- Funder is overcommitted to other projects
- Despite precautions, PI may want to send a less-than-ready proposal.
- Negative perception of others from your organization

# SUPPORT PRIORITY

New faculty and non-native English-speaking  
PIs

Creating a cohesive narrative for multi-  
PI/complex grants

First-come, first-served, ranked according to  
F&A that BUSM receives (R, K, F)

# SUPPORT SERVICES

- Assistance with submission strategy (e.g., choosing proper funding mechanism, contacting POs)
- Copyediting (grammar, formatting): 1 week
- Critical feedback on my full application: 1 month
- General consult with overall grant writing (e.g., help developing and/or refining Specific Aims): 4 months
- Help with a resubmission: 2 months
- Coordinating and responding with internal consistency on a large/multi-PI grant: 6 months

# AM I READY TO WRITE A PROPOSAL?

DARPA operates on the principle that generating big rewards requires taking big risks. But how does the Agency determine what risks are worth taking?

George H. Heilmeier, a former DARPA director (1975-1977), crafted a set of questions to help Agency officials think through and evaluate proposed research programs.



# HEILMEIER CRITERIA

What are you trying to do? Articulate your objectives using absolutely no jargon.

How is it done today, and what are the limits of current practice?

What is new in your approach and why do you think it will be successful?

Who cares? If you are successful, what difference will it make?

What are the risks?

How much will it cost?

How long will it take?

What are the mid-term and final “exams” to check for success?

# WHY THE SPECIFIC AIMS IS THE MOST IMPORTANT PAGE YOU'LL WORK ON

**Reviewers often determine a grant's merit merely after reading the Specific Aims page.**

**It may be the only page most study section members will read.**

**It is a *ROADMAP* for the entire grant.**

# THE THREE GOLDEN RULES OF GRANT WRITING

## **It's a *sales pitch*, not a *murder mystery*.**

- For every inch down that a reviewer has to look to find your thesis statement/what you are doing, your chances of getting that proposal decreases by 10%. (Joseph Barbato, *Writing for a Good Cause*)

## **Do *not* annoy the reviewers!**

- Reviews are done under less-than-ideal circumstances (e.g., family obligations).
- Make it easy to read. Use bold, italics, etc sparingly. Too much and reviewers will think you think they are stupid.

## **Those who *have* the gold *make* the rules.**

- It is easier to find reasons not to fund.

# YOU SERVE TWO MASTERS: YOUR AUDIENCE

**Who are they? What do they know? How do they feel?**

## **Grant Reviewers**

- Scientists' knowledge to your field is related/tangential.
- Evaluations take place **AFTER** their day job.
- Usually aren't paid!

## **U.S. Taxpayers**

- Your grandparents, siblings, neighbors, frenemies, etc

**Direct your writing to address the important goals and missions of your funders!**

“You need to make it easy for them to fund you, and you need to do that by showing them how your specific [project] scratches their itch.”

–Anne Kinney, *Marketing for Scientists*

# HOW DO YOU START?

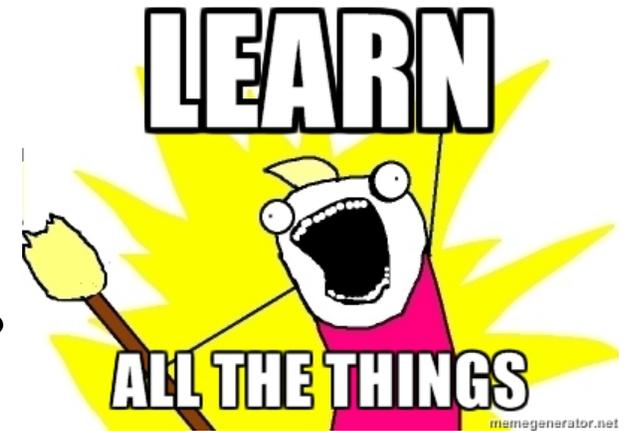
## Pick a topic.

- Does the topic excite you? others in your field?
- Read ALL. THE. THINGS. on this topic.
- What is a problem in your field in this area?
  - What's been funded on your topic before?  
NIH Reporter: <https://report.nih.gov/>
  - Is it important? Does it matter? → Significance
  - Has someone done it before? Is your way of solving the problem unique? → Innovation
- Will it build to subsequent funding?

**Ask your colleagues or mentors to see successful grants or critiques.**

**Read and follow the guidelines! Much easier to find flaws than to build a strong case.**

**BLOCK OUT TIME FOR WRITING YOUR GRANT.**



# BREAKING IT DOWN

**Title**

**Project summary/abstract**

**Significance**

**Innovation**

**Specific Aims**

**Background/Preliminary Data**

**Approach**



# PITHY PHRASES: TITLES

**Brief, but full of substance and meaning**

- Proverbs and sayings

**Being cute? Remember how it might sound to your audience!**

- The Cheerleader Effect, Shrimp Fight Club, etc
- <http://www.businessinsider.com/the-federal-spending-wastebook-documents-government-spending2017-1>
- <https://blogs.scientificamerican.com/guest-blog/confessions-of-a-wasteful-scientist/>

# ELEVATOR PITCH: PROJECT SUMMARY/ABSTRACT

**Along with the title, possibly the only section the public sees**

**How can I refine my pitch?**

- Break your project down into 5-second, 30-second, 1-minute, 2-minute, 5-minute talks
- Practice on your friends.
  - Feedback loop: If Nancy describes your project to Frank, can Frank correctly explain your project to you?

# WHAT'S THE DIFFERENCE? SIGNIFICANCE VS INNOVATION

**Significance:** The positive effect something is likely to have on other things

**Innovation:** A new and substantially different way of considering or addressing something, which results in a positive change

**These justify the need for what you propose**

# WHY SHOULD I CARE ABOUT THIS PROBLEM? SIGNIFICANCE

**Why is this problem important to address?**

- Relevance, how many people does it affect, etc

**What do we already know? What don't we know, gap in knowledge/unmet need?**

- Just the highlights!

**What's the payoff/long-term impact? How will successful completion of this project make life better?**

- Translation, new clinical methodology, treatments, preventive interventions, etc
- Benefits relevant to funder's mission statement

# WHY SHOULD I CARE ABOUT THIS PROBLEM? SIGNIFICANCE

**Discussion should be like a funnel.**

- Move from general knowledge to the specific problem.

**Common pitfalls**

- Not of major public health import
- Lack of a conceptual model
- No stated hypothesis seeking to test → 'fishing expedition'
- Not generalizable

# HOW IS YOUR APPROACH DIFFERENT OR BETTER? INNOVATION

**What advantages does your approach offer over the current gold standard or your competition?**

- Obstacles to progressing to the next step?
- Your approach circumnavigates these obstacles by...
- Novelty? Refinement to existing approaches?

**Is this approach achievable?**

**Use exciting language, make your sell hard-hitting, clear**

**Common pitfalls**

- Incremental

# HOW TO SOLVE THE PROBLEM: SPECIFIC AIMS

**Aims (2-4) should focus on science, not process.**

- Hypothesis statements must be:
  - Verified or rejected through methodological testing
  - Allows for prediction in new circumstances (controls and variables)
  - **Quantifiable!**
- Well-constructed hypothesis statements automatically build in your success and failure criteria.
- Hypotheses can be proven but displaced by new research
  - Newton: Objects with mass attract each other through a gravitational field.
  - Einstein: Objects with mass cause space to bend.

## WHY I'M THE BEST PERSON FOR THE JOB: BIOSKETCH/BACKGROUND/PRELIMINARY DATA

- **What have you done already to show that your approach will likely succeed?**
  - Summarize your data!
- **Provide evidence of your readiness for success**
  - Past publications
- **Why are you the best candidate for the job?**
  - What's your motivation?
- **Is your environment perfectly suited for the project?**
  - What resources are at your disposal?
- **Are you set up for success?**
  - Do you have a supportive mentor/team, department, etc?

# \*THE NITTY GRITTY DETAILS: APPROACH

**For each aim, restate hypothesis.**

**Justify why these experiments are necessary and its feasibility**

- Rationale, why these experiments answer this hypothesis
- Review of literature, any preliminary data

**What are you doing?**

- Will your experiments produce statistically significant results?

**Expected outcomes/return on investment**

**What could go wrong? What happens if these experiments aren't enough?**

- Potential problems and alternative approaches (if your hypothesis is wrong)

# OTHER NITTY GRITTY DETAILS

## **Make a picture!**

- Show study design
- Logic model
- Flow chart
- Evaluation chart

## **Timeline will give reviewers perspective of flow of work**

- Help you figure out illogical sequences to your experimental design

## **Future directions: Where will this lead?**

# GETTING FEEDBACK

**We all have blind spots**

**Ask your colleagues, peers, etc**

**MentorS and colleagueS must have time to review drafts**

- At least 1-2 months in advance of submission deadline

**Ask early and ask often!**

# HOW AM I GETTING GRADED?

## Remember the audience!

- Title/abstract
  - Review section administrators
  - Agency/institute project officers
- Whole grant
  - Primary, secondary, tertiary reviewers
  - (include quotable sections addressing as many review criteria as possible)
- Abstract/Specific aims
  - Other members of study section or review committee

**Don't be overly ambitious! Can you complete the project in the allotted time?**

## Summary statements

- NIH mock review panel:  
<https://www.youtube.com/watch?v=fBDxI6I4dOA>

# HOW AM I GETTING GRADED?

## SUMMARY STATEMENTS CRITERIA

**Investigator:** all skills needed or appropriate collaborators, good publication record

**Significance:** why important

**Innovation:** what's new, why now?

**Approach:** strategy, methods, analyses, ability to identify and resolve challenges, no fatal flaws, human protections, expectations

**Environment:** resources, institutional support, equipment, patient populations

# WHAT DEW RAVEIWRS KNOT WANT TO SEA?

**Slick presentation cannot rescue ho hum content**

**A sloppy grant → Instead aim for**

- No typos
- Avoid long paragraphs
- Subject headings
- Logical flow
- No grammar problems
- Correct references
- Avoid tiny font
- Avoid TNTC abbreviations

**Sloppiness encourages concerns about ability to conduct careful research, publish high impact papers**

**Lucid writing, organized, well-laid out grant makes it easier for the Reviewer to see the science**

**Can a scientist NOT in the field understand the grant?**

# HOW CAN I GET BETTER AT (GRANT) WRITING?

**Read. A lot.**

**Reading to understand how to explain concepts simply:**

- Popular science authors: Lewis Thomas, Stephen Jay Gould, Oliver Sacks, Mary Roach
- Popular science books: Immortal Life of Henrietta Lacks, Hidden Figures
- Journals for a mainstream audience: Scientific American, American Scientist, Popular Science

**Reading to understand how to sell your research:**

- Science fiction: Authors must demonstrate a convincing grasp of feasible science but still sell a whole new **possible** future to a mainstream audience.

“Basically, what happens is, teenagers read these things, they fall in love with the novel, they get inspired by the technology and they keep [it] in the back of their minds till they’re about 30, and then they build it.”

*Paul Saffo, technology forecaster, on how reading sci fi helps him keep tabs on what our future might look like.*

# HOW DO / GET STARTED?

Block out time!

- Distractions exercise (1-26, a-z)

Take lots of breaks!

Have something nonacademic that you are good at

When you should start? **YOU CAN NEVER START TOO EARLY.**

# AVAILABLE RESOURCES

[BMC Foundation Relations and Government Grants](#)

[BU Foundation Relations](#)

[Grant Preparation Workshops](#) (coming Spring 2019)

[K Grant Writing Seminar](#) (Megan Bair-Merritt)

[K-Award Workshop with PDPA](#) (Sarah Hokanson)

[K-to-R Transition Support Program](#) (Tuhina Neogi and Richard Wainford)

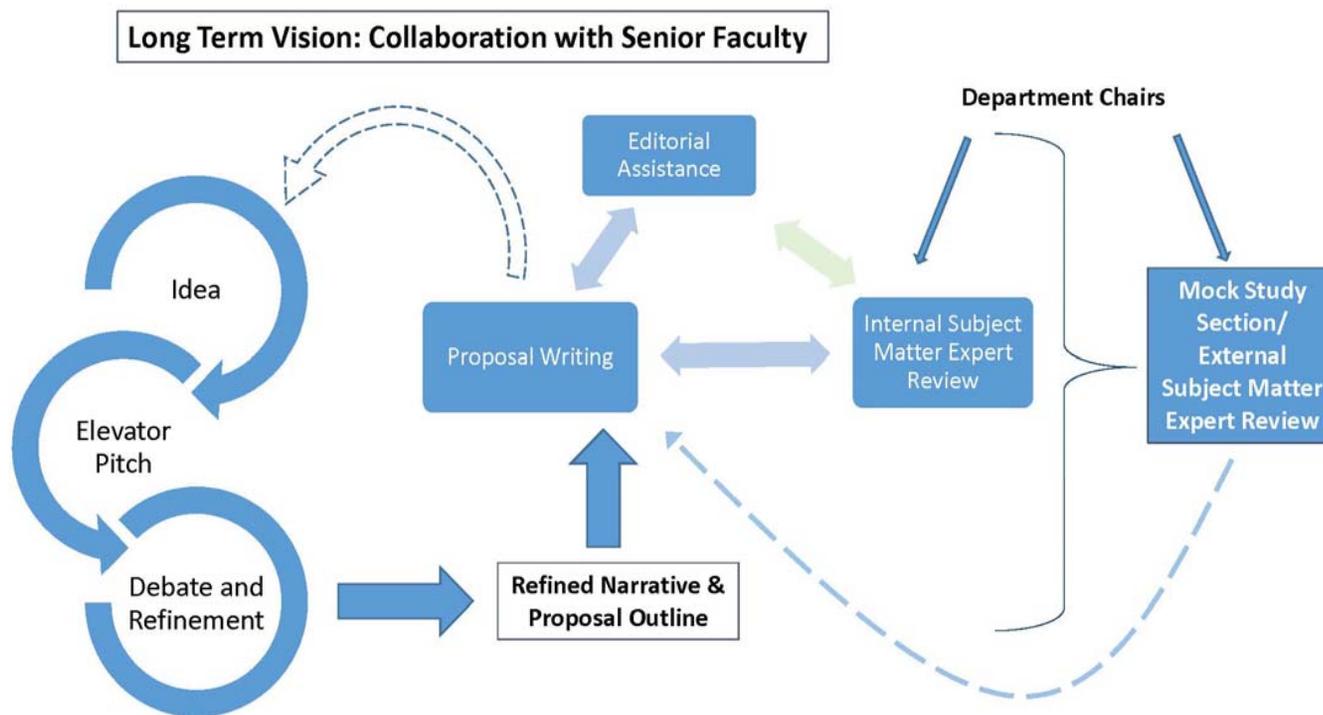
NRSA with [BU's BEST](#) (Amanda Bolgioni-Smith and Andy Henderson)

F30 (MD/PhD students) with Vickery Trinkaus-Randall

[Grantsmanship Seminars](#) with Department of Medicine, Faculty Development and Diversity

# FUTURE DIRECTIONS

- Repository of successfully funded grants
- Support for Letters of Intent, Letters of Support, Literature Review, developing graphics, Project Reports
- Writing retreats and cohorts



<http://www.bumc.bu.edu/proposaldevelopment/>