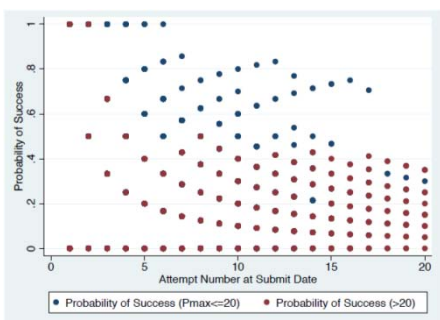# Writing Your CAREER Proposal

2016 NSF CAREER Proposal Writing Workshop
ASME IDETC
Charlotte, North Carolina
August 24, 2016

CAREER Proposal Writing Workshop

Why Are You Here?

CAREER Proposal Writing Workshop

Workshop Goal

Provide potential CAREER awardees with recommendations on developing a competitive CAREER proposal
- What is a CAREER proposal? Who is eligible? The larger context, DOs and DON'Ts
- Setting research and education objectives
- Finding a home
- Writing the summary
- Intellectual Merit and Broader Impacts
- The NSF merit review process
- Ethics
- Getting involved

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What's New for 2017?

- Solicitation NSF 15-555 for 2015 and 2016
- There will be a new solicitation for 2017
- Expect changes, some may affect you—be sure to read the new solicitation carefully
- There will be webinars, join one

Be sure to read the new solicitation when it comes out

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CAREER Program

- "A Foundation-wide activity that offers the National Science Foundation's most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations."
- "Such activities should build a firm foundation for a lifetime of leadership in integrating education and research."

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Success

- "Successful Principal Investigators will propose creative, integrative and effective research and education plans, developed within the context of the mission, goals, and resources of their organizations, while building a firm foundation for a lifetime of contributions to research, education and their integration."
- Quality of the proposal is the key determinant of award or declination, not the PI's home institution

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CAREER Award

- Funds the academic career development of new faculty (it is not a research award)
- "The intent…is to provide stable support at a sufficient level and duration to enable awardees to develop careers as outstanding researchers and educators…"
- Duration: 5 years
- Min amount for 2016: $500,000 in ENG
- Deadline for Engineering: July 21, 2016 (see the new solicitation for 2017)

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Current Requirements!

- Failure to submit by 5 PM submitter's local time will result in the proposal not being accepted
- Authorized Organizational Rep must provide certifications concurrent with submission
- Collaborators and affiliations must be provided as a single-copy document, not in the bio
- Recent changes to bio sketch
- Restrictions to use of pdf for Project Summary
- "Broader Impacts" section required

  > Submit early, expect compliance issues, check your submission and correct problems before the deadline—no changes allowed after the deadline!

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More Requirements

- The GPG goes away in January, 2017 (becomes part of the Proposal and Award Policies and Procedures Guide (PAPPG), but submission remains about the same.
- "The Project Description should provide a clear statement of the work to be undertaken and must include the objectives for the period of the proposed work and expected significance; the relationship of this work to the present state of knowledge in the field, as well as to work in progress by the PI under other support."
- "The Project Description should outline the general plan of work, including the broad design of activities to be undertaken, and, where appropriate, provide a clear description of experimental methods and procedures. Proposers should address what they want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful."

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Caution

- Proposal submission may be via Fastlane or Grants.gov
- Fastlane submission is highly preferred, it has automatic compliance checking for some requirements
- Beware new automatic compliance checks:
  - Late submissions are NOT tolerated, even by 0.1 seconds
  - Failure to pass some checks will prevent submission
  - Non-automatic checks are done manually—you need to meet all PAPPG requirements

2016 Eligibility

- PI must be from a university or 2/4-year college, accredited and with campus in US, or non-profit, non-academic organization (museum, observatory, research lab)
- Untenured Assistant Professor or equivalent <Oct. 1
- Must hold doctorate degree <deadline
- No co-PIs allowed
- No citizenship requirements (except PECASE)
- Employed in tenure track position
- Limit 3 applications (RWRs don't count)

You

- Who are you?
  - Your expertise/interests
  - Your career/life goals
  - Your position/resources
- Your proposal should fit into your life plan

> What is your life plan?
> Do you need to develop a strategic plan?

Your Strategic Plan

- A strategic plan has three parts:
  - Where are you today?
  - Where do you want to be in the future (5, 10, 20 years from now)?
  - How do you get from here to there?
- Questions: What do you want to leave as your career legacy? Do you need to work on important problems?

> A strategic plan is a roadmap for your life

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Your Proposal

- Should advance you toward your life goals
  - Should be a stepping stone to the next thing
- Should be compatible with your institution's goals
- Should represent a contribution to society at large

> Test: If you accomplish your objectives, are you better off for the effort?

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DOs

- Have a strategic plan
- Build on your strengths
- Differentiate this proposal from your Ph.D. thesis work and other sponsored work
- Perform a thorough literature search and exploratory research before writing the proposal
  - Journal articles (update with personal contacts)
- Read the NSF PAPPG
- Establish and keep your contacts

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DON'Ts

- Rush
- Wait until last minute (last month) to contact program directors
- Make the proposed work (research and education) too broad
- Make the proposed work too narrow
- Ask for too much (or too little) money
- Ignore rules (PAPPG) and misc. items – violation of the PAPPG requirements *will* result in return without review
- Try to submit your proposal late

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Proposal Basics

- Write to the reviewers (not to me and not to yourself)
- Your proposal will be judged by the reviewers
- Reviewers want to know four things:
  - What is it about (the research objective)?
  - How will you do it (the technical approach)?
  - Can you do it (you and your facilities)?
  - Is it worth doing (intellectual merit and broader impacts)?
- This is, basically, all the proposal needs to convey – but it needs to convey this

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Getting a Research Topic

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Beware!

The CAREER award is NOT a research award

The CAREER award is a career development award

Your proposal must reflect this focus

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NSF Funds Fundamental Research

- We look for proposals that
  - Are innovative and push the frontiers of knowledge
  - Contribute to national needs and priorities
  - Go beyond marginalia
  - Integrate research and educational goals well
  - Actually involve research, not development
- We do not support (except as incidental to the goals of the award)
  - Developmental efforts
  - Computer programming
  - Design of…
  - Commercialization

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The CAREER Research Topic

- The CAREER proposal is *not* a research proposal
- The CAREER proposal is a proposal detailing how you will spend $500,000 to enhance your career development
- Your career involves a research *path*, not a research project
- Determine your research path - your lifelong research goals - and then identify milestones toward your goals
- Detail the first one or two as the research projects for your CAREER proposal

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Your CAREER Research Path

- Lifelong research goals
  - Don't end with a single project
  - May never end
  - Have broad application
- Examples:
  - To improve our ability to make engineering decisions under uncertainty and risk
  - To perform large-scale modeling of engineering systems thereby enabling better system optimization
  - To improve our understanding of material removal mechanisms enabling improvements in machining operations

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The Selected Research Topic

- It must be research
- It must not have been done before
- It must be significant
- There must be higher than probability zero that you can do it (no perpetual motion machines, no fuzzy logic)
- It must lend itself to a viable research plan – there must be a research methodology
- You must have access to the facilities needed to accomplish the research
- It should fit into your strategic plan

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What is Research?

- Research is the *process* of finding out something that we (everyone) don't already know
- Scientific research builds upon the extant knowledge base and it is methodical, repeatable and verifiable
  - Methodical - you can specify in advance of the research a method to accomplish your objective
  - Repeatable - not a "strange" (random) event
  - Verifiable - tangible evidence

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What is Research?

- Research is the *process* of finding out something that we (everyone) don't already know
- Scientific research builds upon the extant knowledge base and it is methodical, repeatable and verifiable

Question: Exactly what will your research contribute to the knowledge base?

What is Research?

If your proposal focuses an artifact, it's probably development, if it focuses knowledge, it's likely to be research

Ref: Research 101 for Engineers

Groundwork

- Know your field:
  - What is the current state-of-the-art
  - Who are the top ten researchers
  - What are they doing right now
  - Where do they get their funding
  - What do they consider to be the key research issues
  - Who would likely review your proposal
  - What are the opportunities for support

Objective vs. Goal

- Goal: To stay dry
- Objective: Replace the leaky roof over your head
- The goal is what you want to achieve, the objective is how you intend to pursue it
- Goals motivate objectives
- Objectives frame tasks
  - Task 1—remove the present shingles
  - Task 2—install new shingles
  - Task 3—clean up the mess
- We pursue goals, we achieve objectives
- There may be many ways to pursue a goal, but few ways to achieve an objective

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The Research Objective

- This is probably the hardest part of the proposal
- Examples of what not to write:
  - The research objective of this project is to create novel new transformational knowledge.
  - The objective of my research is to provide a quantum leap in the design of anti-gravity boots.
  - The objective of this project is to develop an integrated modeling tool for the hardening process.
  - The goal of this project is to develop innovative advances to enhance wire sawing processes.
  - Rapid prototyping machines are an important part of the vast array of tools. It is very important that we improve these machines. Rapid prototyping will form the backbone of manufacturing in the future.

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The Research Objective

- How to do it right:
  - The research objective of this project is to measure the cross-section of the muon-nutrino interaction at 5 GeV accurate to 5%.
  - The research objective of this proposal is to test the hypothesis that physical phenomena x,y,z dominate the chip formation process in the machining of brittle materials.
  - The research objective of this project is to account for uncertainty in engineering design decision making through the application of utility theory.

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The Research Objective

A well-stated objective leads one directly to the approach that must be taken to accomplish the objective

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The Research Objective

- Four acceptable ways to do it right:
  - The research objective of this proposal is to test the hypothesis *H*.
  - The research objective of this proposal is to measure parameter *P* with accuracy *A*.
  - The research objective of this proposal is to prove conjecture *C*.
  - The research objective of this proposal is to apply method *M* from field *Q* to solve problem *X* in field *R*.

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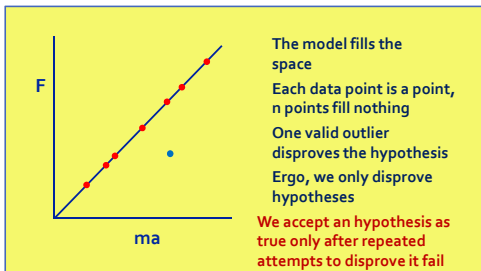
Hypothesis Testing

- If you are going to do an hypothesis test, you need to learn to do it right
  - You must state a testable hypothesis—one for which you can write a plan
  - Recognize that you can falsify the hypothesis or fail to prove it—generally a well stated hypothesis cannot be proven true
  - The test of the hypothesis needs to be well planned
  - Ref: Karl Popper

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Hypothesis Example

- **Force is proportional to rate of change of momentum (F=ma)**

The model fills the space

Each data point is a point, n points fill nothing

One valid outlier disproves the hypothesis

Ergo, we only disprove hypotheses

We accept an hypothesis as true only after repeated attempts to disprove it fail

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Poorly Stated Scientific Hypotheses

- **By adding nanoparticles to aluminum, I can make it stronger**
  - Not falsifiable
- **The addition of additives to steel will make it better**
  - Not falsifiable
- **God exists**
  - Cannot construct a plan to test the hypothesis

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The Research Objective

- **Do not use words that mean "not research"**
  - Develop
  - Design
  - Optimize
  - Control
  - Manage
- **Use of words such as these in the statement of your research objective gives the reviewers the impression that you are not doing research, there is no innovation, nothing is new, etc. – your ratings *will* be lower**

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The Research Objective

- Doing it right:
  - Frame your research: "My research goal is…"
  - Then: "As a step toward this goal, the research objective(s) of this CAREER proposal is(are)…"
  - Limit: 25 words or less
  - Be specific about your research objective
  - Note – if you are specific, the research methodology will follow directly
  - Be sure your statement is comprehensible
  - Put it up front - sentence one, paragraph one, page one
  - Do not give a weather report or state-of-the-union address

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Beyond the Research Objective

- Your proposal must address four critical questions that reviewers will face:
  - What is the proposal about?
    - » Be sure to include clear statements of both research and educational objectives
  - Will the proposed approach accomplish the stated objectives?
    - » Be sure the reviewers are evaluating your approach based on your objectives
  - Can the PI carry out the proposed approach?
    - » Preliminary results and previous work argue this
  - Is it worth doing?
    - » Make the argument through the intellectual merit and broader impacts statements

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Finding a Home

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Questions

- Is your "research" research?
  - If it isn't, it doesn't belong at NSF
- If the answer is "no," skip to the end, look for support from other sources
- If the answer is "yes," what is your research objective?
  - The right NSF home for your research depends on your research objective, not on the application of your research results
  - Be prepared to answer the question: "What is your research objective?" (25 words or less)

NSF does not support applications studies
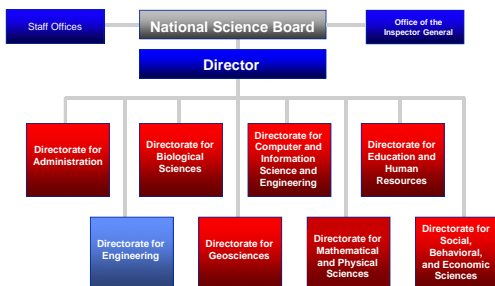

Your Funding Base

- **NSF should not be the sole source of funding for your area of research**
  - Internal support
  - State support
  - Industry support
  - Other Federal agency support

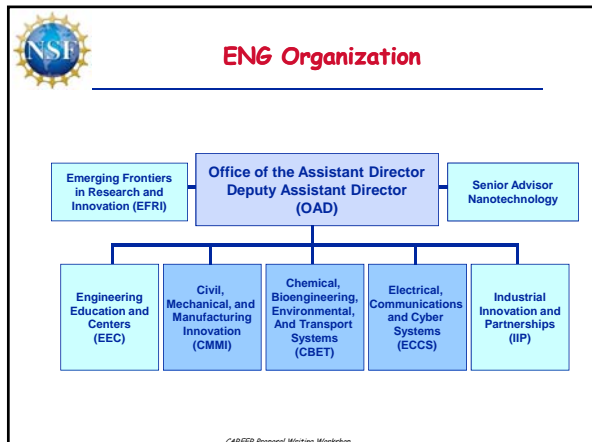**List the potential funding sources for your research area**

NSF is Organized Around Research Topics

ENG Organization

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                    ┌──────────────────────────┐
┌──────────────┐    │ Office of the Assistant   │    ┌──────────────┐
│ Emerging     │    │ Director                  │    │ Senior Advisor│
│ Frontiers    │────│ Deputy Assistant Director │────│ Nanotechnology│
│ in Research  │    │ (OAD)                     │    │              │
│ and          │    └──────────────────────────┘    └──────────────┘
│ Innovation   │
│ (EFRI)       │
└──────────────┘
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| Engineering Education and Centers (EEC) | Civil, Mechanical, and Manufacturing Innovation (CMMI) | Chemical, Bioengineering, Environmental, And Transport Systems (CBET) | Electrical, Communications and Cyber Systems (ECCS) | Industrial Innovation and Partnerships (IIP) |

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The Next Step

- **Look up NSF's web site: www.nsf.gov**
  - Check out research programs, read what research topics they support
- **Then call the appropriate program officers**
  - Be prepared to answer the question: "What is your research objective?" (25 words or less)

NSF does not support applications studies

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Should I Meet My Program Director?

- **Why? What do you intend to gain?**
- **Or is your goal to schmooze? (It doesn't help)**
  - Don't even think about taking your program officer to lunch
- **If you decide to meet:**
  - Be prepared to listen (you don't learn by talking)
  - Be prepared with questions
  - Remember, the program director is not the panel
  - You can get a "free" trip to NSF (more later)

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Important Questions

- Does my research objective fit well with your program?
- What is your funding policy for CAREER awards? What is the maximum size of your CAREER awards? (Remember, the minimum is $500,000)
- How are CAREER proposals submitted to your program reviewed?

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Questions You Shouldn't Ask a Program Director

- Is NSF interested in my topic?
- So, will you fund my research?
- Is this a good research topic?
- What research topic do you think I should work on?
- What are my odds?
- But this is my last chance, what can I do?
- If I send a copy of my proposal to you, will you help me edit it?

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Catch 22

- My research doesn't fit in any single NSF program, how about joint submission/review?
  - Did you formulate a clear research objective?
  - Is your research objective too broad?
  - Do you want to consider focusing your scope?
- Suppose my research really does span multiple programs?
  - Contact all relevant program directors

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How Could a Meeting Help?

- Your program director can:
  - Give advice on proposal submission
  - Help you understand the review of a previous proposal
  - Point you to resources you can use to help write a better proposal next time
  - Give general guidance on good proposal writing
  - Give you ideas for collaborations

Program directors look forward to constructive meetings with PIs

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Could a Meeting Help?

Note - you learn by listening, not by talking. So shut up and listen.

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Writing the Summary

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Writing the Summary

- **The most important statement is the statement of your proposed objectives**
  - It should be at the very beginning
  - Do not begin with a weather report: "The sky is falling. Tools are breaking. Designs are failing…"
  - Do not begin with a state-of-the-union address: "The U.S. lags in the development of a strong manufacturing base…"
- **Remember, this is not a tech paper, it is not a murder mystery (where we find out what the objective is on page 15)**
- **Your Intellectual Merit and Broader Impact statements are important**

The Summary Page

- First paragraph
  - My long-term research goal is…
  - In pursuit of this goal, the research objective of this CAREER proposal is…
  - The research approach is…
- Second paragraph
  - My long-term educational goal is…
  - In pursuit of this goal, the educational objective of this CAREER proposal is…
  - The educational approach is…
- Third and fourth paragraphs
  - Intellectual Merit
  - Broader Impacts
- Anything else *will* lower your rating
- Use the template

Tips on Proposal Writing

- **Use only 12 point font (approved fonts only)**
- **Do not use figures or tables as filler - everything should contribute**
- **Everything should be legible - do not use 2-point font on figures or tables**
- **Be sure to explain exactly what is your contribution to the knowledge base**
- **Use only the required format**
- **Be sure to include a discussion of the broader impacts of the proposed work under the heading, "Broader Impacts"— now required (read the PAPPG)**

Tips on Proposal Writing

- Letters of collaboration must be in the specific one-sentence form noted in the solicitation
- Letters of recommendation are not permitted
- Departmental letter is required, 2 pages maximum
- Don't cut and paste together your new proposal from old declined proposals
- Submit your proposal early, download it, proofread it and correct it if necessary before the deadline

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Important Concept

The reviewers read your proposal, not your mind

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Mentoring for Postdoctoral Researchers

- All proposals submitted after April 6, 2009, that include funding to support postdoctoral researchers must include as a supplementary document a 1-page description of the mentoring activities that will be provided for such individuals.
- Mentoring activities may include:
  - Career counseling;
  - Training in preparation of grant proposals;
  - Publications and presentations;
  - Guidance on ways to improve teaching and mentoring skills;
  - Guidance on how to effectively collaborate with researchers from diverse backgrounds and disciplinary areas; and
  - Training in responsible professional practices.

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Mentoring for Postdoctoral Researchers (Cont'd)

- Proposed mentoring activities will be evaluated as part of the merit review process under the Foundation's broader impacts merit review criterion.
- Proposals that do not include a mentoring plan *cannot be submitted*.

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Data Management Plan

- Proposals must include a supplementary document of no more than two pages labeled "Data Management Plan," which may include:
  - the types of data, samples, physical collections, software, curriculum materials, and other materials to be produced in the course of the project;
  - the standards to be used for data and metadata format and content (where existing standards are absent or deemed inadequate, this should be documented along with any proposed solutions or remedies);
  - policies for access and sharing including provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements;
  - policies and provisions for re-use, re-distribution, and the production of derivatives; and
  - plans for archiving data, samples, and other research products, and for preservation of access to them.

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Follow the NSF Guidelines

- Proposal & Award Policies & Procedures Guide (PAPPG)
- Program Solicitation
  - Sequel to NSF 15-555
- Budget guidelines
  - $500,000.00

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Proposal and Award Policies and Procedures Guide (PAPPG)

- Provides guidance for preparation and submission of proposals to NSF;
  - Allowable fonts, margins, page limits, bio format, etc.
  - Process for deviations from the PAPPG (there will be none)
  - Process and criteria by which proposals will be reviewed
  - Reasons why a proposal may be returned without review
  - Reconsideration process
  - Process for withdrawals, returns & declinations
  - Award process and procedures for requesting continued support
  - Budget line item definitions
  - Process for submission of collaborative proposals (subawards and multiple proposals)

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http://www.nsf.gov/publications /pub_summ.jsp?ods_key=papp

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Award Search Capabilities

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Award Data

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Award Abstracts

ABSTRACT

This Faculty Early Career Development (CAREER) grant provides funding for advancing a new sheet metal forming process, referred to as "hot blank-cold die," which is particularly suited for manufacturing components out of lightweight materials, such as magnesium and aluminium alloys. A coupled thermo-mechanical numerical tool will be developed to simulate the process and capture the non-isothermal material deformation. The numerical tool will incorporate analytical material models that take both anisotropy and changes in the microstructure into account. Uniaxial and biaxial tensile tests will be carried out over a wide range of conditions (temperatures and strain rates), in order to fully characterize material behaviour and calibrate the material models. Overall validation of the numerical tool will be performed by comparing predictions to experimental hot blank-cold die forming runs under various process conditions. The latter will be performed progressively, starting from small-scale lab experiments, to full-scale forming runs of automotive components. Material properties in the formed parts will be evaluated and post-process maps will be constructed, paving the way for future process optimization work.

If successful, the proposed process has the potential to enable the manufacture of these hard-to-form alloys at lower cost and higher throughput than is currently achieved with hot forming operations. The research outcomes could enable product design for these limited-use materials, especially for light weighting of automobiles. The project has educational and outreach components that will foster undergraduate research activities in a graduate-only institution, integrate education and research within a recently-established automotive engineering program, and will enrich educational and outreach activities at the only Children's Museum in the upstate region of South Carolina. The project will also contribute to developing an Educational Television Program that aims at promoting awareness of grand long-term issues (energy conservation, sustainability, etc.), and inspiring the younger generations on how engineering and innovation help tackle such issues.

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Intellectual Merit and Broader Impacts

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IM and BI Statements

- They are required
- Your proposal will be rated based on them
- But:
  - What are they?
  - What should you include?
  - How should they shape your proposal?

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Intellectual Merit

- The Intellectual Merit is the potential that your research has to advance the knowledge base of the field of science or engineering
- Questions:
  - What is already known?
  - What is new?
  - What will your research add?
  - What will this do to enhance or enable research in your or other fields?
- Why is your research important for the advancement of your field?

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Broader Impacts

- The Broader Impacts focuses on the potential benefit to society and achievement of desired societal outcomes
- Means to benefit society include:
  - Economic/environment/energy
  - Education and training
  - Providing opportunities for underrepresented groups
  - Improving research and education infrastructure

  The key issue is how your research results will be applied — why would the general public care?

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Summary Template

Overview - My research goal is… In pursuit of this goal, the research objective of this CAREER proposal is to test the hypothesis that the propensity of a tree to break is directly proportional to how many monkeys are in the tree. The approach will be to take a sample of ten trees and load them with monkeys until they break…

My educational goal is… In pursuit of this goal, the education objectives of this CAREER proposal are… The approach to accomplishing these objectives will be…

Intellectual Merit – It is important that we know how many monkeys can climb a tree before it breaks because this affects our perceptions of monkey procreation and… The Snerd Theory holds that tree size limits monkey procreation. This study challenges that theory with the notion that… If the objective hypothesis is correct therefore, it will transform our approach to…

Broader Impacts – Monkeys are used in medical research. By knowing how many monkeys can fit in a tree, we will be able to provide more monkeys for such research thereby advancing medical science more quickly and improving the quality of life. Also, by watching the monkeys get hurt when the tree breaks, graduate students will be less likely to climb trees, thereby increasing their probability of graduating.

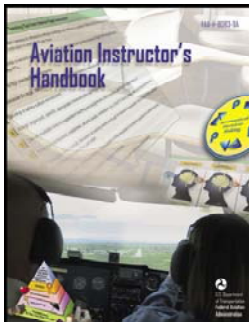*CAREER Proposal Writing Workshop*

Education

- Undergraduate
  - Curriculum
  - Projects (REUs)
- Graduate
  - Curriculum
  - Conferences
  - Involvement with industry, national labs
- Networks, partnerships
- K-12 outreach (RETs)
- Museum projects
- Should not be a boiler plate, pick and choose

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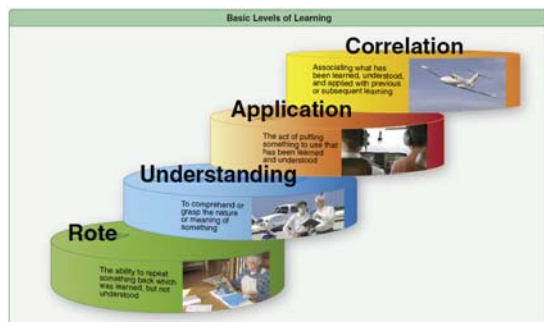
Education—a Reference

You can download this document for free from:

http://www.faa.gov/regulations_policies/handbooks_manuals/aviation/aviation_instructors_handbook/

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Education—a Thought

Assessment and Evaluation

- PIs are strongly encouraged to describe how the impact of the educational activities will be assessed or evaluated
  - Helpful document: NSF publication 02-057, *The 2002 User Friendly Handbook for Project Evaluation*

Caution

Your goals, objectives and approach should drive the proposal, not the need for Intellectual Merit and Broader Impact statements.

Unable to Submit

- **Automatic compliance checks will prohibit proposal submission for several reasons:**
  - Late submission, even by 0.01 seconds—closing time is 4:59:59 local, not 5:00:00
  - Wrong format—fonts, margins, page count
  - Missing bio or bio longer than 2 pages
  - Missing Project Summary or longer than 1 page
  - Missing Project Description or longer than 15 pages
  - Missing budget
  - Missing Data Management Plan
  - Missing Post Doc Mentoring Plan
  - Missing Current & Pending Support
  - Failure to include list of collaborators as a single-copy document
  - If international activities, human subjects or vertebrate animals boxes are checked, must have appropriate details

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Return Without Review

- **Additional compliance check may result in RWR because:**
  - Failure to have ARO signature at time of submission
  - Inclusion of letters of recommendation
  - Failure to include departmental letter, must be less than 2 pages
  - Failure to have department head signature on departmental letter
  - Inclusion of a co-PI
  - Failure to follow single-sentence format for letters of collaboration
  - Failure to follow required bio format
  - Inclusion of appendices
  - Failure to differentiate proposed work from other supported research or a proposal already under review
  - Failure to include references

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Return Without Review

- **Additional compliance check may result in RWR because (more reasons):**
  - Failure to include CAREER solicitation number on the cover sheet
  - Failure to meet eligibility requirements
  - Failure to use the template in the Project Summary (may use pdf only if the use of special symbols is required)
  - Failure to address results from prior NSF support
  - Failure to include a section headed "Broader Impacts"
  - Failure to maintain required line spacing
  - Failure to adequately revise a previously declined proposal
  - Data Management Plan must not exceed 1 page
  - Post Doc Mentoring Plan must not exceed 2 pages

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Take the Oath

- **I hereby promise that I will:**
  - Read the solicitation and PAPPG before I write my proposal
  - Identify and comply with all "musts" in the PAPPG and solicitation
  - Comply with the requirements and the intent of the requirements
  - Submit my proposal days prior to the deadline (4:59:59 PM local time)
- **I hereby promise that I will not:**
  - Fail to follow the proposal preparation requirements
  - Fail to proofread my proposal, downloaded from NSF, after submission but prior to the deadline
  - Trust my SRO to do everything right
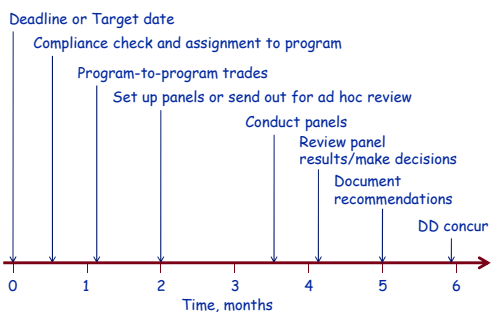
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The NSF Merit Review Process

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Proposal Processing Timeline

Deadline or Target date
Compliance check and assignment to program
Program-to-program trades
Set up panels or send out for ad hoc review
Conduct panels
Review panel results/make decisions
Document recommendations
DD concur

0   1   2   3   4   5   6
Time, months

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Merit Review

- Process: ad hoc only, panel only, combination
- Reviews obtained from non-conflicted experts—at least three required, more typical
- Ad hoc only: PD makes funding recommendation to DD
- Panel: Panel makes recommendation to PD, PD makes funding recommendation to DD
- DD concurs on recommendation—end of process for declinations
- DGA makes an award

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Ethics

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Research Ethics

- Persons submitting proposals to the Federal government are held to high standards of conduct
- Misbehavior can be dealt with quite severely
  - PI may be barred from submission to NSF for 1-5 years
  - May be barred from proposal review
  - At least two cases of jail time (Grimes case, 41 months in Federal prison)
  - Maximum $250,000 fine, 5 years in prison

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Major Forms of Misconduct

- Plagiarism—uncited reproduction of the work of others
- Falsification—intentional misrepresentation of data or results (progress reports)
- Fabrication—making up data
- Double charges—billing the government twice for the same work, e.g., accepting funding from two different Federal agencies for the same work

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Plagiarism

OIG recommends NSF suspend award CMMI-████ (the proposal), "████████," under the direction of Principal Investigator (PI) Dr. ████. The $1██,000.00 grant was awarded to ████ University effective ████, 2011, and expires ████, 2013.¹ It was Dr. ████'s first award from NSF. Dr. ████ also has submitted a CAREER proposal which is pending (CBET-████). OIG is currently investigating an allegation that Dr. ████ plagiarized over 200 lines of text, 1 figure, and 42 embedded references into her proposal.

THIS IS A POTENTIAL FELONY!!!

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Actual PI Responses

- "It's only a proposal. It's not like it's a publication."
- "The reviewers are smart enough to know what is my work and what is someone else's."
- "My English teacher told me it's not plagiarism if I change every seventh word."
- "It's not plagiarism; it's just bad citation."
- "It got funded before."
- "I didn't have space for all the citations."
- "I didn't do it. My grad student/undergraduate/ postdoc/grant writer/faculty colleague/secretary/ Co-PI/SRO/AOR/VP of Research/Dean/spouse wrote that section."
- "It was 'an act of lamentable carelessness' and therefore not misconduct."
- "Severe acid reflux."

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Charging Twice for the Same Work

- *Chemical & Engineering News*, **Feb. 13,** 2012—Federal prosecutors have charged a leading materials scientist with wire fraud, making false statements, and money laundering. The researcher, Craig A. Grimes, formerly an electrical engineering professor at Pennsylvania State University, defrauded federal agencies of some $3 million in research grants, the prosecutors say… Prosecutors also say Grimes applied for and accepted an ARPA-E grant for his solar work, while failing to disclose that the National Science Foundation had already funded the same research. Both agencies prohibit such grant duplication.
- **Grimes is doing 41 months in Federal prison**

Inappropriate Use of Grant Funds

- Padding travel
- Commingling funds
  - » Don't mix business and pleasure expenses
  - » Don't mix grant funds and personal business expenses
- Charging for time not spent on a grant
- Billing items to your grant that shouldn't be billed to the grant
- Billing alcohol or entertainment to a grant
- Charging give-aways to a grant

Inappropriate Use of Funds

States News Service, August 29, 2014

Morgan State University Professor Sentenced To 3 Years In Prison In Scheme To Defraud The National Science Foundation And For Obtaining Kickbacks From Student Stipends

Fraudulently Obtained $200,000 and Attempted to Obtain Another $500,000 through a National Science Foundation Small Business Program
FOR IMMEDIATE RELEASE
August 29 , 2014

Baltimore, Maryland - U.S. District Judge Ellen L. Hollander sentenced Manoj Kumar Jha, age 47, of Severn, Maryland, today to three years in prison followed by three years of supervised release for wire fraud, mail fraud, falsification of records, and theft of government property in connection with a scheme to fraudulently obtain research grants from the National Science Foundation (NSF) and kickbacks from students' stipends. Judge Hollander also entered an order requiring Jha to pay $105,726 in restitution.

Train and Verify

- Faculty and students should be trained—consequences should be made explicit
- Institutions need to perform oversight
- Institutions themselves need to operate in a culture of compliance

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Confidentiality for Panelists

- Breach of confidentiality—never divulge confidential information (NSF Form 1230P)
  - Ideas conveyed in proposals
  - Names of panelists
  - Names of PIs
  - Never use information that you received in confidence

Plagiarism is bad, plagiarism from a proposal you reviewed is a breach of confidence—much worse

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Letters of Support

- It is generally against the law for an employee of the Federal Government to represent a third party to the Government
- Persons working at NSF may not write letters advocating awards for specific PIs

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Multiple Proposal Submissions

- It is permissible to submit multiple proposals to do the same thing to different Federal agencies
  - But it is not permissible to submit the same proposal to multiple NSF units
- It is not acceptable to accept more than one
- If you submit multiple proposals for the same or similar work, be careful to distinguish the uniqueness of each and, if appropriate, accept funding only once

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Falsification and Fabrication

Falsified or fabricated annual reports may constitute a felony

Remember, Al Capone went to prison for lying, not for murder

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Research Ethics Training

- As of January 4, 2010:
  - **Certification Regarding Responsible Conduct of Research (RCR):** The AOR is required to complete a certification that the institution has a planto provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduates, graduate students, and postdoctoral researchers who will be supported by NSF to conduct research.

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Sticky Issue

- **Suppose you collaborate with another faculty member, write a proposal and get an award, then later find that your collaborator plagiarized materials that are in the proposal**
- **You should**
  - Consult with your institutional ethics person
  - Report the matter to the NSF Inspector General
  - Continue to work on the grant
- **You generally will not be held accountable for another faculty member's bad behavior**

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References

- **Responsible Conduct of Research (RCR)**
  - http://nsf.gov/bfa/dias/policy/rce.jsp

- **Research Misconduct**
  - http://www.nsf.gov/oig/resmisreg.pdf

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Misconduct—a Recent Case

A former Iowa State University professor has pleaded guilty to two felony counts of making false statements to the National Science Foundation, federal prosecutors announced Tuesday.

Palaniappa Molian, of Ames, pleaded guilty Friday to the charges in a written plea agreement with federal prosecutors in the U.S. Attorney's Office for the Southern District of Iowa.

ISU officials confirmed Tuesday that Molian was a professor in the College of Engineering beginning in 1982, and retired on Dec. 31, 2013.

In December 2009, "Molian claimed in a requested reimbursement that he traveled to Boston, Mass., to work on an Iowa State University National Science Foundation grant research experiment," according to a press release issued Tuesday by the U.S. Attorney's Office for the Southern District of Iowa.

Molian admitted in the plea agreement that "he did not perform any work on the grant research experiment in Boston, and that he traveled to Boston for unrelated reasons," the press release said.

The reimbursement expense voucher Molian filed for the trip to Boston was for $1,223.37, court documents that were unsealed Friday show.

Molian also pleaded guilty to submitting a Small Business Innovation Research Program Report to the NSF in July 2010, seeking approximately $20,000 in laser rental costs, "when he had access to a laser at no cost," the press release said.

"The laser costs claimed in the Final Report were false and (Molian) spent the excess grant funds on unrelated personal expenses," court documents show.

As part of the plea agreement, federal prosecutors agreed Molian will not be charged in the Southern District of Iowa for any other federal criminal offenses arising from or related to the investigation.

Exceptions to this agreement would be "any criminal act occurring after the date of this agreement, any crime of violence, or any criminal offense which (Molian) did not fully disclose to law enforcement during (Molian's) interviews," court documents show.

The plea agreement also states that Molian and the prosecutors "agree to recommend a sentence of probation," but if a judge doesn't impose the recommended sentence, either party can withdraw from the plea agreement, and the case will be set for trial.

Molian has agreed to pay restitution "for all relevant conduct," according to the terms of the plea agreement. The amount of restitution will be determined by a judge.

Molian will also be required to pay a mandatory special assessment fee of $200 at or before sentencing.

The maximum sentence for making a false statement to a federal agency is five years imprisonment and a maximum fine of $250,000.

Molian was required to turn over his two passports to probation officers, and was released from custody on promise to appear, court documents show. He will be sentenced April 25 at the U.S. Courthouse in Des Moines by Chief U.S. District Court Judge James E. Gritzner.

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Parting Thoughts

Remember, if your grad student writes your proposals, you are responsible for their content, and you are the person in trouble if there is a breach of ethics

You have worked hard to establish your career, don't ruin it by a breach of ethics

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Getting Involved

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Be A Reviewer

- Proposal review is an important service to your community
- There's no better way to see how the system works
- There's no better way to understand what makes a winning proposal
- If you think the system is unfair, try being part of it

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How to Volunteer

- Contact your program director
- E-mail a brief (1-page) bio to your program director
- Be sure to include your contact information
- Indicate your areas of expertise

> This will get you an expense-paid trip to visit your program director

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12 Steps to a Better Proposal

1. Know yourself - strengths/weaknesses
2. Know the program from which you seek support
3. Read the program announcement and PAPPG
4. Formulate clear and appropriate research and education objectives
5. Develop a viable plan to accomplish your stated objectives
6. State your objectives up front in your proposal
7. Frame your project around the work of others

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12 Steps to a Better Proposal

8. Grammar and spelling count
9. Format and brevity are important
10. Know the review process
11. Proof read the proposal before you submit it
12. Submit your proposal early and proof read it after you submit it

> Writing a good proposal takes common sense and effort—it's not magic

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Questions

- It's always better to ask before you submit a proposal than after you get the reviews
- Remember, we're from the government, and we're here to help

http://www.nsf.gov

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