

NSF CAREER Writing Workshop –
My personal experiences

St. Louis, Missouri
22nd March 2016

Brigid Mullany
Associate Professor
Mechanical Engineering
UNC Charlotte
North Carolina

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Workshop
21st - 22nd
March 2016



Short bio

- Education:
 - Ph.D. University College Dublin, Ireland ('02)
- Professional Experience
 - Marie Curie Post Doc, Carl Zeiss, Germany ('02 – '04)
 - Associate Prof., Mech. Eng., UNC Charlotte, NC ('04 – now)
- CAREER Proposal History
 - Submitted CAREER in 2005 – declined
 - Submitted CAREER in 2006 – declined
 - Attended the NSF CAREER Workshop
 - Submitted CAREER in 2007 – awarded

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Content is based on my personal experiences of writing a CAREER proposal.

It reflects only my thoughts on what is required for a good, and hopefully successful, proposal

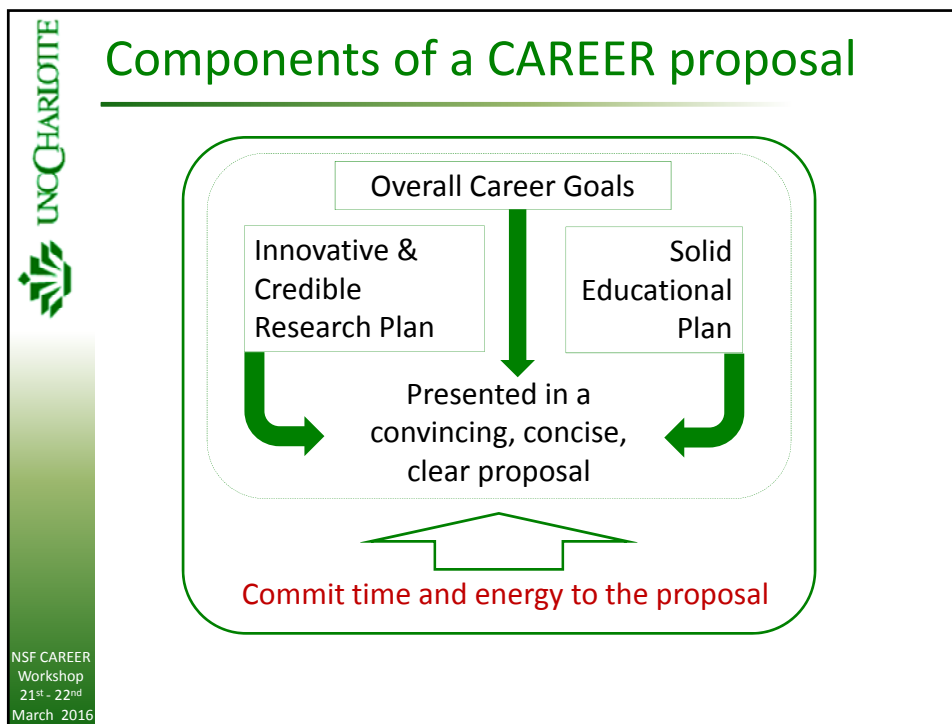
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Full history of my CAREER proposals

2005	Took an unsuccessful NSF proposal, made it longer, and more expensive.	➔	Research aspect not liked (again). Didn't address Career goals adequately.
2006	Read the CAREER Guidelines. Redefined my research area- finished defining it on the 14 th of July 2006. Ran short on time to write the proposal	➔	Criticized for: <ul style="list-style-type: none"> •Poorly developed research plan •Poorly written proposal
2007	Believed in my redefined research topic, got prelim results, spoke to my Program director, served on an NSF Panel, attended the CAREER workshop, started the write up early & made it a #1 priority	➔	Success

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Time and energy

- CAREER deadlines are in July but ...
 - You'll need time to recover from the academic year
 - Motivational slump ?
 - Faculty members who promise to read your proposal will take holidays, go to conferences, etc.
 - Industrial collaborators (letters of support) will also take holidays.
 - ...

Factor in time for the above and plan accordingly.

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Research plan – Overall career goals?

- What are your long term career goals (5, 10, 20yrs)?
 - What will I be happy researching over the next 20 years?
 - What is feasible with respect to my skill set?
 - What is feasible with respect to my college's infrastructure?
 - What do I not want to end up doing?
 - What do I want to achieve over the next 5, 10, 20 years?

Even if you never write a CAREER proposal, you should still be able to answer the above questions.

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Research plan – how it fits within NSF?

Become familiar with the different NSF Programs and isolate the one that best fits your work.

In the 'best fit' program, find out exactly what qualifies for funding:

The following is what the MME program looks for:

"... Competitive projects will propose hypothesis-driven research that advances the frontiers of knowledge in relevant areas. Proposals submitted to the MME program should include a clearly articulated research (not developmental) objective and a coherent plan to accomplish the stated objective. Both experimental and theoretical work are supported. All proposals must include a statement outlining the societal benefits of the proposed activities, including the proposed research, in a separate section labeled "Broader Impacts of the Proposed Work". ..."

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13346&org=CMMI&more=Y

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Research plan- Elements needed for the CAREER

Your research plan should aim to be:

- **Innovative, fundamental science**
 - Basic NSF requirements (intellectual merit of work)
- **Substantial – you get 5 years to do it**
 - Ambitious (non incremental) but realistic
- **Reasonably feasible**
- **Something you are excited about**
 - if successful you will have to do it (5 years is a long time)
- **Open up other research avenues**
 - possible industrial collaborations (industrial funding for more applied aspects)

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Research plan- What I proposed

- I had one main research goal
 - Three tasks feed into the one goal
 - Tasks are sequential (but not completely interdependent)
- Experimental and theoretical components
- Had some preliminary results to illustrate feasibility of proposed research
- Collaboration with Industry

...Other recipes also work

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Educational plan

- Propose what you are comfortable with.
 - Again, if successful you will have to do it.
- Propose realistic educational components
 - Time required to initiate more ambitious plans may be prohibitive
- No need to reinvent the wheel
 - Lever existing programs
 - Summer camp programs identify suitable K-12 students and brings them to campus – find the programs
 - Someone has already isolated feeder high schools and has contact with them- find that person
 - Mentoring programs already exist -find the programs

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Educational plan

- Don't forget the obvious items (... they will be missed)
 - Web pages and courses
 - Integration of info into existing classes (modules)
 - Seminars and workshops
 - Industrial visits and invite industry to campus
 - REU's
 - ...

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Overall career vision

Outline the long term vision of your career, and how a CAREER award will positively impact it

- Raise profile within college - how will you lever this new raised profile?
 - Joint proposals, more collaborative work ...
 - Teach modules in other classes – exposure to more undergrad students – get better grad students etc.
- Adds credibility when talking to industry - how will you lever this increased credibility?
 - Make site visits (budget for travel)
 - Offer to give talks onsite or at conferences etc
 - Actively seek industrial funding for spin off applications

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Bringing it all together

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graph TD
    A[Overall Career Goals] --> B[Innovative & Credible Research Plan]
    A --> C[Solid Educational Plan]
    B --> D[Presented in a convincing, concise, clear proposal]
    C --> D
    E[Commit time and energy to the proposal] --> D
  
```

Presented in a convincing, concise, clear proposal

Commit time and energy to the proposal

N.B.

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A well written proposal

The 15 page proposal and project summary are the only tools available to you to convince people that your work is worthy of support – learn how to use them effectively.

Observe:

Read successful and unsuccessful proposals (NSF review panels, Workshop)

Read the manual:

Formal: Read the rules on fonts sizes, BI & IM requirements, program scope. **Informal:** First line- first paragraph rule, terminology to avoid ... etc.

Practice:

How hard can it be? Answer: Usually harder than you think.


A functional feed back loop:

Ask colleagues to give feedback on the proposal and listen to their comments. Previous NSF reviews ...etc

What makes a proposal convincing?

- Firstly, you have to be 100% convinced the work is essential.
- Concrete evidence stating why the problem needs to be solved
 - Find facts and figures stating how much this problem costs industry each year
 - Find (and reference) alternative sources stating that this problem needs to be solved
 - Know (and list) the industries that can be positively impacted by this work
- Demonstrate a clear knowledge of the current available technologies and their shortfalls
 - Solid list of references

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What makes a proposal convincing?

- **Letters of Collaboration**
 - Industry (give data, allow you to test on site etc ...)
 - Educational programs (you have actually made contact with the relevant people)
- **Refer to past educational programs you have leveraged**
 - For example, if you have worked with REU students in the past, mention it in the proposal ... it establishes a track record.
- **Refer to other related funding already secured**
 - Small college or university based grants already secured in this topic area shows you are serious about it

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Sum up ...

- There is always hope
- Commit to the proposal
- Start early
- And, of course ...

Good luck

Brigid Mullany
UNC Charlotte
bamullan@uncc.edu
www.coe.uncc.edu/~bamullan

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