UB CAREER AWARD ROUNDTABLE

Presented by the

Office of Research Advancement

University at Buffalo The State University of New York

Workshop Agenda

- Welcome and Housekeeping Items
- Brief Overview of the CAREER Proposal
- Introduction of Panelists
- Panelist Presentations (~20 minutes)
- Question & Answer Session (~30-40 minutes)

Housekeeping Items

- Please stay muted unless asking a question or entering discussion
- Chat box and hand raise functions in Zoom – the Q&A will take place after the panelist presentations. Questions may be asked directly or typed in the chat box and they will be addressed in turn. To ask a question directly please use the hand raise function under “reactions” and the moderator will call on you; at that point, please unmute yourself to ask your question.
- This workshop will be recorded, and a link to the video will be posted to the ORA website.
- A PDF of the slides will be made available to everyone after the workshop.

SUNY NSF Broader Impacts Virtual Workshops

April 23, 2021 – 9:30 am to 4:00 pm

June 4, 2021 – 9:30 am to 4:00 pm

SUNY is partnering with the NSF sponsored Center for Advancing Research Impacts in Society (ARIS) to provide Broader Impacts training for any faculty working on NSF grants or faculty wanting to learn more about Broader Impacts, and how to communicate the relevance of their research to broader audiences. *$50 registration fee applies.

The June offering will focus on writing Broader Impacts for junior faculty preparing CAREER proposals.

April 23 Workshop RSVP: https://www.eventbrite.com/e/suny-nsf-broader-impacts-virtual-workshop-registration-145334069113

June 4 Workshop RSVP: https://www.eventbrite.com/e/suny-nsf-broader-impacts-virtual-workshop-registration-145341571553

About the 20-525 NSF CAREER Award – Due Date: July 26

- A CAREER proposal details how you will use NSF funds to enhance your career development as a researcher and educator. It is ***not*** a standard research proposal. A CAREER proposal highlights what you ***uniquely*** bring to your field and how the proposed research path will help you achieve your long-term research agenda and career goals.
- A well developed, creative, and appropriately referenced educational plan that fits with your overall research goals is key. ***Poor educational goals are the #1 reason for why an otherwise good CAREER proposal fails.*** Education and research should be integrated, with each component benefiting and supporting the other.
- ***Broader Impacts –*** the potential for your research to benefit society and contribute to the achievement of desired societal outcomes - is an ***important, but separate*** section from your education plan.

20-525 NSF CAREER Award Continued

- NSF strongly recommends ***talking with your program officer early***, once you have an outline of your CAREER plan.
- Draft a budget that reflects your actual research and educational needs. Consider setting aside funds for ***assessment and evaluation***. If your budget is above the solicitation minimums, NSF also encourages you to discuss your planned request with the program officer.
- ***Seek feedback from colleagues***. Work with knowledgeable colleagues to review your proposal draft and challenge and refine your ideas.
- ***Involve your Department Chair early***. Don't put the Chair letter off until the last minute. It is a very important part of the proposal package and requires the Chair to have a good understanding of your proposed work.
- ***ORA can help!*** The Office of Research Advancement can assist with templates, document support and editing and review. We see many CAREER awards each year. Contact ubgrants@buffalo.edu to set up a meeting.

Featured UB CAREER Award Panelists (in order of appearance)

- **Minghui Zheng, PhD** – 2021 Awardee
  Department of Mechanical and Aerospace Engineering

- **Weihang Wang, PhD –** 2021 Awardee
  Department of Computer Science and Engineering

- **Ann-Marie Torregrossa, PhD** – 2020 Awardee
  Department of Psychology

- **Souma Chowdhury, PhD** – 2021 Awardee
  Department of Mechanical and Aerospace Engineering

NSF CAREER Proposal Writing Tips

Minghui Zheng
Mechanical and Aerospace Engineering Department
University at Buffalo

April 2021

My Background

- Assistant Professor of Mechanical and Aerospace Engineering
- Joined UB in 2017
- Ph.D. from University of California, Berkeley in 2017
- Research focus: planning, learning, and control in robotics

- Served on six NSF panels so far
- Submitted nine NSF proposals as PI so far, four awarded
- Submitted first CAREER proposal in Aug 2020, awarded

My Story

- Submitted CAREER proposal to a new program announced Feb 2020: **Fundamental Research in Robotics**
- Jointly managed by the Directorates for Engineering (ENG) and Computer and Information Science and Engineering (CISE)
- All proposals are handled as part of a single unified program – 11 PMs in total; do not know which PM will handle my proposal.
- Most of my regular proposals were submitted to ENG

My Tips – CAREER Workshop

I have participated three CAREER workshops in total

SUNY CAREER Workshop, 2019
- General writing tips, especially on proposal summary

NSF CAREER Workshop (ENG), 2019
- Mock panels, discussion with several PMs
- Read successful and unsuccessful proposals in ENG

NSF CAREER Workshop (CISE, online), 2020
- One to one meeting with PMs

Other Tips

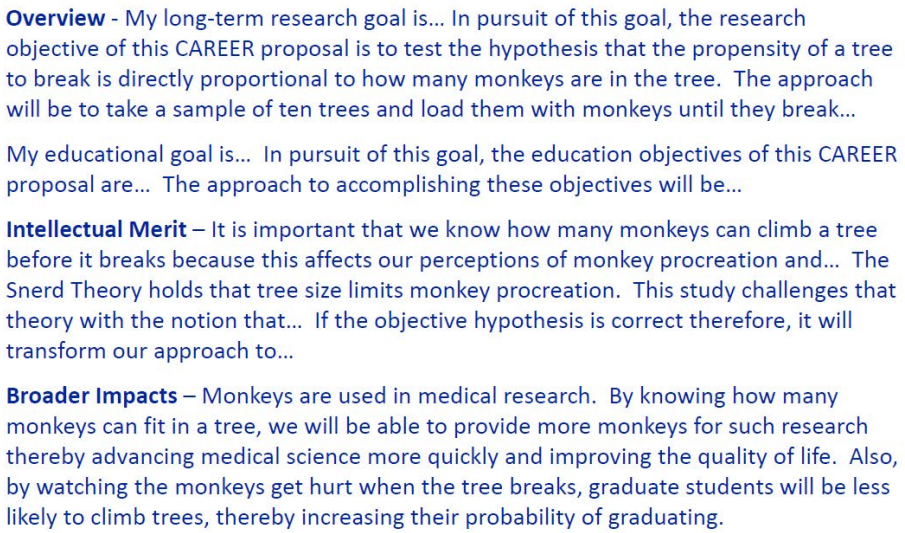
- Put myself in the reviewer's shoes
- Reduce/avoid technical jargon
- Use accessible language
- Ask colleague/friend to read your proposal and give critical comments
- Utilize figures to illustrate ideas

" Among the proposals I reviewed in this panel, this might be the cleanest, with a clear motivation in mind, an ambitious but doable plan, logically organized in coherent, complementary tasks geared towards the stated vision."

- Don't discount broader impacts and education components (budget/senior personnel)
- Leverage existing education programs (BEAM, Tech Savvy, etc.) at UB. Education part: not necessarily novel but needs to be cropped

Useful Links

- https://cisecareerworkshop.web.unc.edu/previous-workshops/
  Many Sample CAREER Proposals (CISE)
- https://www.k-state.edu/research/faculty/proposal/prepare/career/Pei-proposal-writing-tips.pdf
  NSF CAREER Proposal Writing Tips (64 pages, by ZJ Pei)
- http://129.130.42.171/NSF2018/subfolder/CAREER%20Workshop%20Presentation%202018.pdf
  Project Summary Template



Overview - My long-term 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.

University at Buffalo The State University of New York

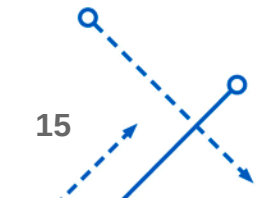
UB NSF CAREER Roundtable

April 15, 2021

Weihang Wang
Computer Science and Engineering

Outline

- NSF Program
- First Submission: July 2019
- Second Submission: Aug 2020
- Summary: Lessons I Learned



NSF Program

- My Research Focus
  - Software Testing, Program Analysis

- CISE (Computer and Information Science and Engineering) Directorate
  - CCF (Computing and Communication Foundations) Division
    - SHF (Software & Hardware Foundation) Program

First Submission: July 2019

- Preparation:
  - 4 weeks
  - Read others' proposals (awarded and not awarded)
  - Read my papers (published and in progress)
  - Focus on high-level theme
  - Insufficient time on the education plan
  - Not enough time to prepare for the admin documents (thanks to proposal specialists' help!)

First Submission: July 2019 (continued)

- Result:
  - Declined, Competitive
  - Suggestions for improvement:
    - Education plan is insufficiently developed
    - The complexity of the proposed work should be justified
    - Most of the first proposed task has been done
    - Comparison with existing approaches should be further elaborated
  - Positive feedback:
    - Qualified with publications on web code analysis and protection
    - Evaluation plan is well described and sound
    - Collaboration with industry (e.g., Facebook) attests to the importance

Second Submission: August 2020

- Preparation:
  - 3 weeks
  - Improved the depth of the proposed work
    - Added one new task that supports program analysis on code written in multiple web languages
  - Changed the high-level theme
  - Improved the education plan
    - Created concrete plans for outreach activities and designed detailed course projects
  - Added more discussion on comparison with existing approaches

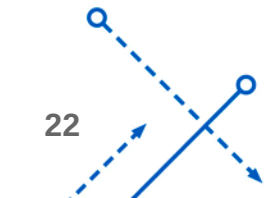
Second Submission: August 2020 (continued)

- Result:
  - Awarded, Highly Competitive
  - Suggestions for improvement:
    - Countermeasure of the proposed protection should be further developed
    - How difficult it is for practitioners to use the proposed system should be discussed
  - Positive feedback:
    - Cohesive and well-motivated research plan
    - Novel cross-language program analysis
    - Qualitied with many publications in the field

Summary: Lessons I Learned

- The research plan should be cohesive
- Balance between published work and new proposed work
- Education plan is important (at least for my program)
- Prepare early
  - Have the admin documents ready early
  - Get familiar with the submission process

Good Luck!



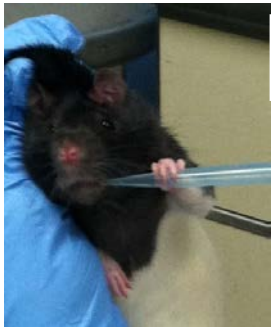
UB NSF CAREER Roundtable

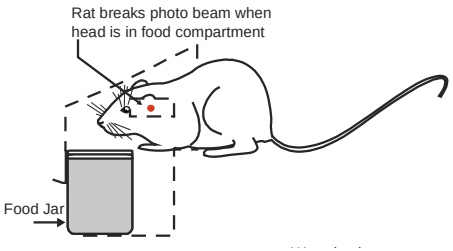
Ann-Marie Torregrossa
Department of Psychology

The laboratory of Taste and Feeding

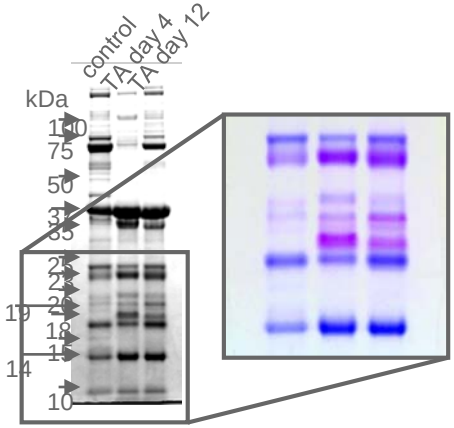
All taste compounds are dissolved in saliva

We collect saliva from rats while we measure feeding and taste-driven behaviors





We measure what proteins are in the saliva



We measure how these proteins alter taste responding

Nothing makes sense except in the light of evolution

-Dobzhansky 1973

Salient Points on NSF CAREER Award

Souma Chowdhury

NSF CAREER Award – My Story

- Program: **ENG – CMMI – Engineering Design and Systems Engineering (EDSE)**
- Project: ***Automated Design of Decentralized Robust and Explainable Swarm Systems (ADDRESS)***
- Year: **2021** (success in 3rd attempt)

History:

- **First attempt (2018) – *declined***
  - similar topic, but had very little prior work
  - rushed preparation
  - reviews regarding research were mixed, with important critical comments
  - education plan got hammered
  - Cannot comment on impact of program manager (did not have significant interaction with PM in this cycle)

NSF CAREER Award – My Story

History (continued):

- **Second attempt (2019) – *declined***
  - similar topic, had some prior work by now
  - more steady preparation
  - Addressed previous year's critical review comments
  - Reviews (this time) regarding research were distinctly positive
  - education plan still got hammered (evaluation mechanisms and novelty was not evident)
  - Did have interactions with PM, and got the feeling that the topic area of my proposal may not be among the PM's top priorities – I gave substantial thought to whether to switch to CISE/Robotics programs, but stayed with EDSE since my writing style, IM and prior work was better aligned with EDSE.

NSF CAREER Award – My Story

History (continued):

- **Third attempt (2019) – *awarded***
  - similar topic, had significant prior work by now
  - Cut down on research tasks, and increased depth on remaining ones
  - reviews regarding research were positive, w.r.t. both the novelty (IM) and the timeliness of the potential applications (BI).
  - education plan was well received – some questions raised regarding potential impact
  - New PM --- Did have interactions with PM (incl. Zoom meetings); new PM was helpful in pointing out the importance of outlining the long-term career vision, and how outcomes of my research helps the future engineer designer or systems engineer.
  - Post review (before the proposal was “recommended”), PM requested clarification on how the Career project builds upon or is connected to my other sponsored work (other DARPA/NSF projects), and more details on the evaluation plan for my educational propositions.

What I learnt from my experiences (beyond typical advice)

- **Engage with your PM as early as possible** (even if your idea is not fully formed) – with many programs removing the deadlines on their standard proposals, PMs have more sway on facilitating the career proposals (IMO), and are genuinely interested to engage with you
- **Discuss review comments with PM** – especially if the PM remains the same for the next cycle
- **Write daily in general** – Do you need to focus on CAREER proposal preparation for 3-4 months? Not necessarily – Instead, the important thing to do is write proposals on a DAILY basis (irrespective of the target agency and program). Every proposal you write helps you fine tune your ideas, presentation skills, response to feedback, and in the case of collaborative proposals, exposes you to alternate writing styles.
- **Evaluation Plan for your Educational Tasks (required)**
- Write and re-write (and get internal feedback on) the **first two pages of the Project Description** – more important than everything else, at least for ENG division proposals (IMO).
- **Having "Prior Work" always helps**

For anyone submitting CAREER proposals to Engineering (ENG) division - I am no expert, but I'll be happy to read and give feedback on the first 2-3 pages of your project description.

Email: soumacho@buffalo.edu

Questions?

Contact ORA: ubgrants@buffalo.edu

http://www.buffalo.edu/ora

Additional Resources:

- NSF CAREER FAQ: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf20025
- NSF CAREER Solicitation: https://www.nsf.gov/publications/pub_summ.jsp?WT.z_pims_id=503214&ods_key=nsf20525
- NSF CAREER Webinar Information and RSVP (May 14 and May 20, 2021): https://nsf.zoomgov.com/webinar/register/WN_CdBfoDo9QqCEV2h3roKiGQ%20%20%20