NSF Graduate Research Fellowship Program: Writing Your First Grant Application!

Sally Pasion, PhD. Associate Professor of Biology, San Francisco State
Koni Stone, PhD. Professor of Chemistry, Stan State
Nancy Au, MFA, Adjunct Professor, Stan State
Jessica DeSilva, PhD. Assistant Professor of Math, Stan State
Fauna Yarza, Graduate student, UCSF  (SJSU, CC alum)
Matt Cover, PhD. Professor of Biology, Stan State
From Community College to Graduate School

Fauna Yarza
CSUPERB 2019

Contact:
@micro_fauna
Fauna.Yarza@ucsf.edu
Who am I?

- SJSU alumni
  - Biological sciences, concentration in microbiology
- NSF GRFP awardee
- UCSF graduate student
  - Biomedical Sciences Program
Outline

• My academic journey
  • Factors that contributed to a successful GRFP application
    • Funded research opportunities
    • Science communication
  • How the NSF GRFP has helped me in graduate school
My academic journey
My academic journey
My academic journey

High school graduate (2009)

This image cannot currently be displayed.

(2009 – 2010)
My academic journey
My academic journey

- High school graduate (2009)
- San Francisco State University (2009 – 2010)
- Sierra College (2010 – 2014)
- San José State University (2015 – 2017)
My academic journey

High school graduate (2009)

San Francisco State University (2009 – 2010)

Sierra College (2010 – 2014)

University of California, Berkeley (2016)

San José State University (2015 – 2017)
My academic journey

- High school graduate (2009)
- San Francisco State University (2009 – 2010)
- Sierra College (2010 – 2014)
- University of California, San Francisco (2016)
- GRFP (2017 – Present)
- San José State University (2015 – 2017)
Outline

• My academic journey
• Factors that contributed to a successful GRFP application
  • Funded research opportunities
  • Science communication
• How the NSF GRFP has helped me in graduate school
Funded undergraduate opportunities

- NIGMS training programs
  - Increase presence of underrepresented students in biomedical sciences
  - Research Initiative for Scientific Enhancement (RISE)
  - Maximizing Access to Research Careers Undergraduate Student Training in Academic Research (MARC U-STAR)
Research at an outside institution

- NSF Research Experience for Undergraduates at UC Berkeley
Some of the funded opportunities for you

Summer Research Program

UC San Francisco offers exciting summer research opportunities for undergraduate students in the health sciences.

Apply for the 2019 SRTP cycle. The deadline to apply is February 1, 2019.

Matthew R. Cover

Summer Research and Professional Development Programs for Undocumented College Students in STEM Fields
Outline

- My academic journey
- Factors that contributed to a successful GRFP application
  - Funded research opportunities
  - Science communication
- How the NSF GRFP has helped me in graduate school
Science communication: presentations

“… Her research productivity has been highlighted by awards and presentations… “
Science communication: presentations

Travel scholarships are available
Science communication: outreach

”… The applicant has been involved in a number of programs for underrepresented minority students, and she is dedicated in giving back to the community as a mentor…”
Outline

- My academic journey
- Factors that contributed to a successful GRFP application
  - Funded research opportunities
  - Science communication
- How the NSF GRFP has helped me in graduate school
Joining a thesis lab with funding
Take away points

- A non-linear academic journey can be successful
- Valuable experiences
  - Research at an outside institution
  - Presentations
  - Giving back to the community
- Bringing your own funding also brings confidence
Thank you

Dr. Elizabeth Skovran
Dr. Karen Singmaster
Dr. Leslee Parr
Dr. Cleber Ouwerney
My journey as an undergraduate.

“Why not?”

“Why not?”
A shot in the dark…

- REU advisor recommendation
- A research proposal?
A shot in the dark…

- REU advisor recommendation
- A research proposal?
- Reached out to current fellow for advice
- Asked Stan State professors for feedback
- Submitted! (Last minute…)
A shot in the dark…

or so I thought!

Dear Jessica Christine De Silva:

Congratulations! I am pleased to inform you that you have been selected to receive a 2013 National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP) Fellowship. Your selection was based on your outstanding abilities and accomplishments, as well as your potential to contribute to strengthening the vitality of the US science and engineering enterprise.
Being an NSF-GRFP fellow.

• VIP at campus visits
• Time to focus on coursework and research
• Workshop and conference support
• Internship opportunities
• Grant Award on CV

“I am a fellow.”
You are the ideal candidate.

• You have a *unique* story
• Goal-getter personality
• Support from your faculty
• Opportunities
  • Research programs
  • Community outreach
  • Conference presentations
• **Networking** skills
Takeaways

Ask yourself “Why not?”

Maximize every opportunity.
Questions for Fauna and Jessica?
During the break, ask us about:

- Friday: 8:30 am  Grand Ballroom A
- "Tips for Making the Most Out of the CSUPERB Symposium"
- Bring all of your friends!
What is the NSF GRFP?

- National Science Foundation
- Graduate Research Fellowship Program
- Supports Graduate Study leading to research-based Master’s and Doctoral degrees in STEM or in STEM education.
- The application will show how the applicant has Demonstrated Potential for significant research achievement in STEM or in STEM education
- Three years of support in graduate program ($34K to student, and $12K to institution, per year) over up to a 5-year period.
- 1,500 awards made each year (~17% award rate)
Who is Eligible to Apply?

- Senior undergraduates, postbac (not in graduate program), or
- 1st or 2nd year graduate students (apply only once)
- Have completed no more than twelve months of full-time graduate study (or the equivalent)
- US citizen, national, or permanent resident
- Must be enrolled in
  - a university, college, or non-profit academic institution of higher education accredited in the United States, its territories, or possessions, or the Commonwealth of Puerto Rico that offers advanced degrees in STEM or STEM education no later than fall of the award year
- Must be accepted in graduate program at time of Fellowship acceptance (May 1 of award year)
What disciplines?  When do I apply?

• STEM or STEM education
  • Not professional health science degree
  • Not clinical or patient-oriented project
  • Not directly health-related
• Application deadlines in late October (varies by discipline)

<table>
<thead>
<tr>
<th>Fields of Study</th>
<th>2019 Deadlines</th>
<th>2020 Deadlines</th>
<th>2021 Deadlines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Sciences, Geosciences</td>
<td>October 22, 2018 (Monday)</td>
<td>October 21, 2019 (Monday)</td>
<td>October 19, 2020 (Monday)</td>
</tr>
<tr>
<td>Computer and Information Science and Engineering, Engineering, Materials Research</td>
<td>October 23, 2018 (Tuesday)</td>
<td>October 22, 2019 (Tuesday)</td>
<td>October 20, 2020 (Tuesday)</td>
</tr>
<tr>
<td>Psychology, Social Sciences, STEM Education and Learning</td>
<td>October 25, 2018 (Thursday)</td>
<td>October 24, 2019 (Thursday)</td>
<td>October 22, 2020 (Thursday)</td>
</tr>
<tr>
<td>Chemistry, Mathematical Sciences, Physics and Astronomy</td>
<td>October 26, 2018 (Friday)</td>
<td>October 25, 2019 (Friday)</td>
<td>October 23, 2020 (Friday)</td>
</tr>
<tr>
<td>Reference Letter Submission DEADLINE</td>
<td>November 2, 2018 (Friday)</td>
<td>November 1, 2019 (Friday)</td>
<td>October 30, 2020 (Friday)</td>
</tr>
</tbody>
</table>
Application Components

TWO STATEMENTS

1. Personal, Relevant Background, and Future Goals (3 page limit)
2. Graduate Research Plan (2 page limit)

THREE Letters of Recommendation (2 page limit)

Official Transcripts
NSF Merit Review Criteria

Reviewers will be asked to evaluate all proposals against two criteria:

• Intellectual Merit:
  • The Intellectual Merit criterion encompasses the potential to advance knowledge; and

• Broader Impacts:
  • The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

www.nsfgrfp.org
Additional Review Criteria for GRFP

Applicants are reviewed on their demonstrated potential to advance knowledge and to make significant research achievements and contributions to their fields throughout their careers. Reviewers are asked to assess applications using a holistic, comprehensive approach, giving balanced consideration to all components of the application, including the educational and research record, leadership, outreach, service activities, and future plans, as well as individual competencies, experiences, and other attributes. The aim is to recruit and retain a diverse cohort of early-career individuals with high potential for future achievements, contributions, and broader impacts in STEM and STEM education.
What is the review process?

• Each panelist reviews ~30 applications
• Each application is reviewed by three panelists.
• For each application, each panelist provides:
  • a categorical ranking for both IM and BI:
    Excellent / Very Good / Good / Fair / Poor
  • Written comments on IM and BI, and a summary statement
  • An overall numeric ranking (1-50)
• Online, video discussions: Panelists review the rankings, identify differences of opinion, and have breakout discussions about individual applications
• Panelists make recommendations of awards to NSF
• NSF reviews and makes awards and honorable mentions
Insight on review process?

• Consider “evaluator fatigue”…

• Well-written, memorable statements can lead the panelist to ADVOCATE for the applicant during discussions

• Help reviewers identify Intellectual Merit and Broader Impacts criteria

• Highlight your track record for leadership in activities that support the broader impacts criteria
Project Management*

• How to make things happen
• Making good decisions
• Figuring out what is required
• Ideas and what to do with them
• How not to annoy people
• Leadership and trust
• Making deadlines
• What to do when things go wrong

*from Scott Berkun, *Making Things Happen: Mastering Project Management*
Research on adult learning indicates four essential principles of success:

1. Active involvement (doing the work)
2. Effective use of resources
3. Social interaction/ collaboration
4. Self-reflection (or self-assessment) – see three points above!
Project: Writing a Grant, Applying for Jobs, Applying to Grad School/ Med School/ Professional School

The assignment planning and tracking tool that you can use is based on an project development plan (PDP). Writing down the plan is a forcing function-with key features:

• The work (requirements)
• The skills needed
• The support required
• The time line
Break up the project

Write down the parts of the project, list what you will need to get the part done and give each part a deadline.
# Project Development Plan

<table>
<thead>
<tr>
<th>Goal</th>
<th>Deadline</th>
<th>Specific Skills needed</th>
<th>Strategies needed to build skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete application:</td>
<td>October 2019</td>
<td>Develop a research plan:</td>
<td>• Meet with instructor to discuss research ideas and previous experiments.</td>
</tr>
<tr>
<td>• Research plan</td>
<td></td>
<td>• Ask a question.</td>
<td>• Give a rough draft to a professor for feedback.</td>
</tr>
<tr>
<td>• Personal Statement</td>
<td></td>
<td>• Find relevant literature.</td>
<td>• Set deadlines for interim goals.</td>
</tr>
<tr>
<td>• Transcripts</td>
<td></td>
<td>• Understand the experiments that generated the data.</td>
<td>• Students and faculty meet deadlines.</td>
</tr>
<tr>
<td>• Letters of Recommendation</td>
<td></td>
<td>• Propose new experiments.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Effectively communicate understanding in writing.</td>
<td></td>
</tr>
</tbody>
</table>
Strategies for your next big writing assignment.

- Break it up into manageable steps, write down reasonable deadlines.
  - Reasonable for you to complete,
  - Reasonable for you get support/ feedback before it is due.
- Assess your skills/information—what do you need before you can start and complete each step?
- Start the project and stay on course.
# Applying for a GRFP

<table>
<thead>
<tr>
<th>Part</th>
<th>Due date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach faculty member(s) to enlist them as reviewer(s) of your personal statements and research plan. You need a mentor (or two) for this project.</td>
<td>February 10th</td>
</tr>
<tr>
<td>Brainstorm about areas of research that you want to do, read the literature and discuss your ideas with your research advisor, lab mates, friends, family, pets. You need an original idea of your own.</td>
<td>Month of February</td>
</tr>
<tr>
<td>Take your rough idea of research area and propose a hypothesis. Share this with your research advisor.</td>
<td>March 1</td>
</tr>
<tr>
<td>Read the literature on this topic. Use notecards to summarize what has been learned from each journal article.</td>
<td>Month of March</td>
</tr>
<tr>
<td>Personal Statement version 1.0 ready for someone (Advisor, other professor, Writing Center Staff etc.) to read.</td>
<td>April 20</td>
</tr>
<tr>
<td>Approach Reference Letter Writers, give them information about the GRFP.</td>
<td>May 10th</td>
</tr>
<tr>
<td>Use the summer to polish your personal statement and to write your research plan. Deliver your Personal Statement 2.0 for wider review, give your research plan to your research advisor.</td>
<td>August 20th</td>
</tr>
<tr>
<td>Review your Academic Transcripts: make sure nothing will prevent their release. Remind your Letter of Reference writers of the October 2019 deadline.</td>
<td>August 20th</td>
</tr>
<tr>
<td>Meet with your research advisor to discuss your research plan, use feedback to improve your research plan. Schedule weekly meetings as you refine your proposal.</td>
<td>September 15</td>
</tr>
</tbody>
</table>
Letters of Recommendation

How to get a “Yes! I will be happy to write a letter”

• Ask in person.
• Ask someone that you have had recent interactions with.
• Ask long before the deadline.

How to get a strong supportive letter of recommendation:

• Provide as much information about yourself: what you are applying for? Why are you applying? How are you qualified? Use the form supplied in your packet as a guide.
• Give them the deadline(s) and how/where to send the letters.
• Stay in touch. Gentle reminders help. This is a part of your project management: making sure someone else delivers.

Let them know the results of your application.
Sit back, relax and enjoy the view!
Personal Statements

Nancy Au, MFA
www.peascarrots.com
nau@csustan.edu

With tremendous thanks to Matthew R. Cover, PhD!
Writing Experiment #1

A Portrait

Draw a portrait of a special person in your life...

Consider:

• someone you think about often, or
• someone who your Science could impact, or
• someone who has inspired you to pursue Science
Literary Terminology:

Poetic constraint

freewrites

timed writing
What examples of leadership skills and unique characteristics do you bring to your chosen field?
Writing Experiment #2

“Mad Transports”

Describe a moment from your life that you are most proud of, a time you might return to over and over in your mind.

Consider: a time when you stood up for yourself or others, or a time when you surprised yourself, or a time when you did something you didn’t think you could...
Personal Statement Essay Prompt (NSF)

“Describe your personal, educational and/or professional experiences that motivate your decision to pursue advanced study in science, technology, engineering or mathematics (STEM).”

Consider: “Why are you fascinated by your research area?”
Writing Experiment #3: 
*Catalysts*

Write *into* your First Time with Science.

**Literary Terminology:**
Defamiliarization, sensory detail
Personal Statement Essay Prompt (NSF)

“Include specific examples of any research and/or professional activities in which you have participated.

Present a concise description of the activities, highlight the results and discuss how these activities have prepared you to seek a graduate degree.”
Writing Experiment #4

Hauntings

What is one thing that haunts you about one of your scientific endeavours? This haunting might be a lingering question or a specific moment or an interaction with a colleague or a research subject, etc.

Consider: Imagine the loved one that you drew in the first exercise. Imagine how this question (and science) will impact them? Does this haunt you? If so, how and why?
Personal Statement Essay Prompt (NSF)

“Describe the contributions of your activity to advancing knowledge in STEM fields as well as the potential for broader societal impacts.”
Writing Experiment #5

Conduits

1. Describe the most memorable moments during one of your science jobs, or volunteer positions, or internships, or mentorships, or teaching a sibling (or someone) about the science of bees (or or or...).

   **Experiment:** Use sensory detail. For example, where was the light coming from? What was the temperature in the air? Were your fingers tingling, your heart pounding? etc.

1. How do you see yourself as a conduit between your science and the rest of the world?

   **Experiment:** Imagine speaking to your favorite grandparent or younger sibling or cousin. Tell them why you are doing this important work. Tell them how it will impact their lives.
“What personal and individual strengths do you have that make you a qualified applicant?”
Describe a difficult time at school or at work or at home when you needed help.

Consider:
What did you do?
Who did you reach out to?
What was the outcome?
### On Seeing a Watermelon

By: Monika Kumar *(Translated from Hindi by Sampurna Chattarji)*

<table>
<thead>
<tr>
<th>Seeing a watermelon was my introduction to vastness.</th>
<th>You were stubborn in your insistence:</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can only approximate how much I love you:</td>
<td>the earth is round as an orange.</td>
</tr>
<tr>
<td>by the handful,</td>
<td>You refused to accept it could also be like a watermelon.</td>
</tr>
<tr>
<td>as much as the sea</td>
<td>Anyway!</td>
</tr>
<tr>
<td>or not at all.</td>
<td>...</td>
</tr>
<tr>
<td>Approximations fail me</td>
<td>All estimations are a failure of my language.</td>
</tr>
<tr>
<td>when I look at a watermelon.</td>
<td>I need a few signs of exclamation mad transports that will gently translate my failures.</td>
</tr>
<tr>
<td>How red it will be</td>
<td></td>
</tr>
<tr>
<td>how fleshy</td>
<td></td>
</tr>
<tr>
<td>how its meditative eyes would be arrayed inside.</td>
<td></td>
</tr>
</tbody>
</table>
Writing Experiment #7

Mother Tongues

Describe a time when you felt like you were straddling two different worlds.

Consider: Why? Who populated these two spheres? What was the source/cause of the tension? Was there a cultural or linguistic or generational or personal belief system at the root of the conflict?
“Mic Drop”

Nancy Au
www.peascarrots.com
nau@csustain.edu
Broader Impacts Criteria – societally relevant outcomes

• full participation of women, persons with disabilities, and underrepresented minorities in STEM
• improved STEM education and educator development at any level
• increased public scientific literacy and public engagement with science and technology
• improved well-being of individuals in society
• development of a diverse, globally competitive STEM workforce
• increased partnerships between academia, industry, and others
• improved national security
• increased economic competitiveness of the US
• and enhanced infrastructure for research and education.
PART I: SORTING

Each table has

- INDEX CARDS and PENS
- ONE LARGE POST-IT POSTER
  - Make a Venn Diagram

**Intellectual Merit | BOTH IM&BI | Broader Impacts**
PART I:  SORTING (continued)

- **THINK:** Each team member should think of
  
  - one example of **INTELLECTUAL MERIT** and write it down on one index card and
  - one example of **BROADER IMPACTS** and write it down on a second index card
Broader Impacts Criteria – societally relevant outcomes

- full participation of women, persons with disabilities, and underrepresented minorities in STEM
- improved STEM education and educator development at any level
- increased public scientific literacy and public engagement with science and technology
- improved well-being of individuals in society
- development of a diverse, globally competitive STEM workforce
- increased partnerships between academia, industry, and others
- improved national security
- increased economic competitiveness of the US
- and enhanced infrastructure for research and education.
Sorting the IM/BI examples & Carousel Graffiti

**PART I: SORTING (continued)**

- **THINK:** Each team member should think of
  - one example of **INTELLECTUAL MERIT** and write it down on one index card and
  - one example of **BROADER IMPACTS** and write it down on a second index card

- **SHARE and SORT:** Each team shares their IM/BI ideas and places them in IM, BI, or IM and BI sectors on the large poster on their table
SORTING THE IM/BI EXAMPLES & CAROUSEL GRAFFITI

PART II: Carousel Graffiti
- Each team will visit NEW posters for ~4 minutes and write comments (GRAFFITI!) on the posters
  - Teams may contribute multiple thoughts per poster.
  - Do you agree? Disagree? Are you confused? Ask a question!
  - You may repeat ideas from previous teams! You may also disagree with other teams, and even your own team....
NSF Graduate Research Fellowship Program:
Writing Your First Grant Application

Sally Pasion, @sgpombe
Koni Stone, @konistone1
Nancy Au, nau@csustan.edu
Jessica DeSilva, @JessicaDeSilva9
Fauna Yarza, @micro_fauna
Matt Cover, @matthewrcover