Applying for NSF CAREER Awards

Spring Quarter Pre-Tenure Workshop
May 1, 2023
Prior CAREER workshop resources

https://advance.washington.edu/services/prettenure
CAREER Awardees and Panelists

> Jess Werk, Associate Professor, Astronomy
> Prashanth Rajivan, Assistant Professor, Industrial & Systems Engineering
> Laura Prugh, Associate Professor, School of Environmental and Forest Sciences
Jess Werk
Associate Professor, Astronomy
The Story of My NSF CAREER Award

Jessica Werk, Associate Professor of Astronomy, University of Washington

Reduced to $714,594

Actually, started in July 2021
Example Paragraph One: A vs. B

1 Overview

The Milky Way’s gaseous circumgalactic medium (CGM) is a fossil record of its formation, a driver of its ongoing evolution, and a harbor for the material for future star formation. The atoms that make up our planet, the air we breathe, and our bodies all passed through the Milky Way’s gaseous halo billions of years ago. While comprehensive, multidimensional maps of our Galaxy’s stars, interstellar dust, gas and magnetic fields are expected from recent and upcoming all-sky surveys, its multiphase gaseous halo is still mapped to only $d \lesssim 15$ kpc, a scant $\sim 5\%$ of its likely extent. With this proposed work, I will measure the baryonic content, gas motions, and chemical composition over the full extent of the warm-ionized Galactic halo for the first time. These pioneering efforts will produce the first comprehensive characterization of both the disk and halo of our Galaxy, providing critical data needed for our theory of the Milky Way’s evolution, and deeper insights into the processes that govern the evolution of other galaxies. The resulting study of the physical coupling of disk and halo gas – which likely have distinct origins and energetics – is possible only in the Milky Way.

1 Overview

Gaia has ushered in an era that will be defined by scientific breakthroughs in virtually every aspect of the Milky Way’s evolution. With its second public data release in 2018, we now have constraints on positions and velocities for nearly two billion of the Milky Way’s stars. This information is especially powerful in combination with benchmark, ground-based surveys such as RAVE (Steinmetz+2006), GALAH (Buder+2018), APOGEE-2 (Majewski+2017), and soon, LSST (Ivezic+2019), and with data from all-sky surveys covering different wavebands: HI4PI (Bekhti+16), WHAM (Haffner+16), Planck (Planck Collaboration+18), and WISE (Wright+10). It is now possible to map three-dimensional stellar age distributions, space motions, and metallicities along with three-dimensional distributions of dust, multiphase gas, and magnetic fields. Understanding the complex physical processes happening within the Galaxy’s disk – MHD turbulence in a multiphase ISM, star-formation and evolution, Galactic dynamics, and chemical evolution – is a broad goal of modern-day astrophysics that finally seems within reach.
Best Advice I Received: How You Frame your Argument on Page One is Crucial

- Central Narrative: ABT Framework
- Emphasize Need and Urgency
- Not only is there a problem, but you are the one to solve it

Little Miss Muffet sat on a tuffet, (AND) eating her curds and whey (BUT) along came a spider who sat down beside her and (THEREFORE) frightened Miss Muffet away.

Agreement – AND – set up
Contradiction – BUT - problem
Consequence – THEREFORE - solution

Image credits: Wolf of Wall Street and Dr. Randy Olsen’s StoryCirclesTraining.com
Additional Advice

- Have a colleague or two outside of your subfield read your page one and give feedback.
- Consider a schematic figure and a timeline graphic.

Schematic and timeline graphics organized around the five major questions my proposal addressed.

Figure 1: PROPOSAL SCHEMATIC: An illustrated summary of the experiments described in §2, addressing key science questions 1-5. UV absorption-line spectra for both halo stars (d \( \approx 10 \) kpc) and QSOs (\( z \gg 0 \)), combined with additional, multi-wavelength archival datasets, will physically link the Milky Way disk with the dynamic, multiphase MWCGM for the first time.

Table: Science Goals and Timeline

<table>
<thead>
<tr>
<th>Year</th>
<th>Goal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021-2022</td>
<td>Year 1</td>
<td>Study medium, brightly-ionized outflow in local HST/Spitzer field</td>
</tr>
<tr>
<td>2023-2024</td>
<td>Year 2</td>
<td>Study metal-line outflows via NLR maps</td>
</tr>
<tr>
<td>2023-2026</td>
<td>Year 3</td>
<td>Study metal-outflow from QSOs, evolution of metallicity</td>
</tr>
<tr>
<td>2024-2025</td>
<td>Year 4</td>
<td>Study metallicity evolution and feedback effects</td>
</tr>
<tr>
<td>2024-2026</td>
<td>Year 5</td>
<td>Study metallicity evolution and feedback effects</td>
</tr>
</tbody>
</table>

Figure 7: Year by year breakdown of effort by PI, postdoc (PD), and graduate student (GS), all of whom will lead the planned analyses. Plotted publications are highlighted in gold, with the tentative first author listed in the lower right corner. Integrating out results with rich archival datasets and simulations will take place in the final two years of the program. All data will be publicly released in a timely manner.
Prashanth Rajivan
Assistant Professor, Industrial & Systems Engineering
My CAREER Story

• [Jan 2019] Began my journey at UW and I wasn’t thinking of CAREER at that time.
  • There was a bigger responsibility to take care - birth of my daughter that summer 😊
  • After that COVID hit - a newborn inside the home and Covid-19 outside
• [Jumping to FALL 2020] - What would become my CAREER plan and WHEN?
  • What – This was somewhat clear to me. I had been working on this topic since my post-doc years. I had some background work and some general directions
• When – This wasn’t clear.
  • Rewind to ADVANCE NSF CAREER workshop in 2019 – suggested waiting until you had a solid idea. So stuck to that suggestion. Thank you!
• [Back to Fall 2020] - I started sketching few ideas within the topic, but I was not sold on most of them myself.
  • BTW, I was hit with rejections right and left. Quite a few dark days!
• Right about this time, some work I was doing with my PhD student had some interesting results, but more importantly produced some interesting questions.
• Following up on these questions eventually lead to developing my CAREER proposal.
My CAREER Story

• I started writing around the end of May 2021 but was building the idea in my head for several months
  • I was also building off a previously failed proposal (Not a CAREER)

• Reviewed successful applications – how to structure, language to use, how to integrate educational plan, how much emphasis to place on different sections, etc.

• Discussed comments from my failed proposal with my PM (I knew the program) – this was several months before. This was very useful.
  • Take way – Took the reviews seriously. It helped me understand where I must focus.

• Two UW resources – UW Advance and PEER group

• PEER Group: My colleague (Youngjun Choe) organized a CAREER peer group to help each other write and submit. This was game-changing for me. It kept me motivated. So, a big thanks to my colleagues!
  • First attempt with CAREER - > Successful (PM called a few days before thanksgiving to give me the good news)
Challenges and Few Parting Thoughts

• Challenge: Integrating education and research plan
  • Reasonable and achievable, yet innovative
  • Leverage existing activities and complement existing courses
  • Feedback from our department chair was helpful

• Parting thoughts:
  • Getting students passionate with your ideas could open new ideas
  • Use feedback from past submissions to scope and prioritize activities
  • Get help. Just talking about your ideas and challenges with a mentor or a colleague (and really listening) can be surprisingly helpful
  • It was always on my mind until I got it… like many things I am honored and humbled that I got it.. but I also understand CAREER cannot be the only thing that defines me.
  • Try to take care of your mental health – I am guilty of not doing that.
Laura Prugh
Associate Professor, School of Environmental and Forest Sciences
Laura Prugh, School of Environmental and Forest Sciences
DEB CAREER: Integrating positive and negative interactions in carnivore community ecology
• Received PECASE award in 2019

**Message 1: Intellectual Merit is key**

- Evaluation process varies. Sometimes your proposal is evaluated alongside “normal” proposals; panelists tend to weigh “normal” criteria higher than “special” criteria. Sometimes CAREER specific panels.
- What is your Big Idea and why is it novel and important?
  - “The joint study of scavenging and intraguild predation represents a new frontier in carnivore ecology”
- What is your plan to tackle your Big Idea?
  - Reviewers must clearly understand how your methods allow your hypotheses to be tested
- How will your project resolve an important gap in your field?
Message 2: Show how the grant will launch your (already promising) career

• Include an “about the PI” section
• Give reviewers a sense of who you are and what your integrated research/teaching program is all about: what is your vision for your career?
• Indicate how the proposed project fits naturally within your broader program
• Provide evidence of past success: key papers, preliminary results to build from, teaching innovations, existing partnerships
Message 3: Teaching is not the same as broader impacts

- “Integrated research and teaching program”
- “Teacher-scholar” (get a good letter from your department!)
- What are your educational goals? Cite pedagogical literature
- How will you assess the success of your educational objectives?
- How are you integrating the teaching and research components?
- Explain how the teaching side improves the research side, not just vice versa (how are they synergistic)
- Ratio of ~10 pages on research plan, 5 pages on teaching plan and BI
More Resources
Some UW Broadening Participation Contacts

> OMAD College Access programs:
  – https://www.washington.edu/omad/pre-college-recruitment/

> OMAD student services programs:
  – https://www.washington.edu/omad/services-for-uw-students/

> CoEnvr DEI programs:
  – https://environment.uw.edu/about/diversity-equity-inclusion/

> Arts and Sciences DEI resources:
  – https://artsci.washington.edu/about/diversity-equity-inclusion

> CoE DEI resources:
  – https://www.engr.washington.edu/about/diversity
Reminder:
CAREER “Speed Dating” Abstract Review and Writing
June 22nd 1pm—2pm in ECE 303
Call for RSVPs forthcoming
Questions?