For some people, a single word changes everything. Nadia Szeinbaum experienced this when she was 14 years old.

"High school was the first time I heard the word ‘redox,’” Szeinbaum said, “I was in a biology class and I knew at the time ‘this is it.’ This is what I want to be involved in my whole life.

“I was very curious and fascinated by the concept, which has been the theme of my research since my PhD—how does life use electrons to get energy? I wanted to understand all the different ways that life has to exist.”

LIFE IS PEACHY

Today, Szeinbaum can be found in the labs of the Georgia Institute of Technology in Atlanta, Georgia, as an Astrobiology Fellow for the NASA Postdoctoral Program.

“Astrobiology research is fascinating because it is so broad and full of deep, fundamental questions that I love thinking about,” said Szeinbaum. “When I got introduced to the Astrobiology community here at Georgia Tech, I had already been wondering about the role of microbes on early Earth.

Continued on page 3
NPP Third Year Funding

Written by: Dr. Joan Schmelz, NPP Director

As many of you know, you can continue in the NASA Postdoctoral Program (NPP) for a total of three years, but funding for the third year is not guaranteed. I’m often asked where that third-year funding can come from? In many cases, it depends on your NASA Center and the NASA program that funds your appointment.

Perhaps the most straightforward funding source for an NPP third year could come from your advisor. If both you and your advisor are interested in continuing your collaboration, the current grant has additional funding, and there is additional work to do on your project or related research; this grant could be used to fund your third year. The most important step here is to talk to your advisor about your interest in continuing with NPP to see if this possibility exists.

A second possible source of funding the something called the “Center Balance.” Some NASA Centers carry over funds from the previous year to fund third-year projects. Talk to your advisor and your center representative to see if your center does this and if these funds could be used to continue your research.

The third possible source of funding is for you to write a grant proposal. By far, the overwhelming number of these proposals will be to the NASA Research Opportunities in Space and Earth Science (ROSES) program. You can find some recently revised general directions in the NPP Policy & Procedures document and the FAQs. Different NASA Centers have different rules about proposal submission. It is important to discuss these options with your center representative well in advance of the proposal deadline. You should talk in detail about the proposal research topic, funding opportunity, and submission details with your advisor early in your second year.

Some NASA Centers offer extensive training in proposal writing. USRA is working to bring this type of training to all fellows, regardless of location. We invited Dr. Max Bernstein, the NASA Science Mission Directorate Lead for Research and the editor of the annual ROSES NASA Research Announcement, to give an introductory lecture for first-time proposal writers. The event took place on March 6 at NASA Ames Research Center and was made available to all fellows via video conference.

During his presentation, Proposal Writing: An Introduction to ROSES, Max covered 1) implications of the NASA structure for research solicitations; 2) layers of instruction, e.g., NASA guidebook/summary of solicitation/program element; 3) past selections; 4) evaluation criteria; 5) details of the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES); 6) comments/feedback prior to submission; 7) panel evaluation; and 8) questions.

In case you missed Max’s presentation, USRA is hoping to provide another opportunity, possibly late summer or early fall at an NPP Symposium event hosted by JPL. We have invited Dr. Christina Richey, the Program Manager of the Solar System Exploration Science Research and Analysis Office at JPL. Dr. Richey provides guidance on the proposal process and trains researchers on best practices for proposal submission and review. Stay tuned for updates.

Best of luck with third year funding!

The views, thoughts, and opinions expressed in this article belong solely to the author.
Spotlight on Dr. Nadia Szeinbaum

EARLY EARTH

“I use synthetic microbial communities to look at how microbial interactions would have played a role in the oxygenation of Earth. Synthetic communities are built by using microbial strains that are relatively well-known in terms of their genetic composition and physiology.

“This experimental approach is used to uncover interactions among microbes that may not be obvious or predicted just by looking at the individual populations on their own. When put together new properties appear, such as cooperation or competition, that can be measured and observed. I am studying these interactions in the context of an early Earth.”

Szeinbaum hypothesizes that there are numerous types of microbial interactions that would have supported biological innovations throughout the history of microbes on the planet. She is specifically interested in the ecology surrounding oxygenic photosynthesis.

“The first phototrophs making oxygen on the planet were cyanobacteria,” explained Szeinbaum. “At the time, there were no plants or animals. Cyanobacteria oxygenated the planet. But oxygen has a downside. It can be very toxic, especially in the conditions of early Earth, which was anoxic. Everything that was living at the time used anaerobic enzymes, and these were very sensitive to oxygen.

“Modern Earth, of course, has many ways to deal with the toxic oxygen byproducts from breathing or generating oxygen. There are enzymes that help with this toxicity—but where did the enzymes come from? When did they appear? Were the organisms that created oxygen the same ones that produced the enzymes? We don’t know whether this was the case or whether organisms developed these protection mechanisms and shared them [within the community].

“I think an experimental system is a good way to test these types of ideas because there are no places that look like an early version of Earth where these cyanobacteria would have lived, so I basically recreated it in the lab.”

LAB WORK

“I tried a few different ways to grow phototrophs with non-phototrophic bacteria until I found the right setup to grow these different types of bacteria that allowed me to keep the media well mixed and prevent it from evaporating. I do my work in an anoxic chamber, with a timed light source to mimic the day and night, and chose culture wells like little petri dishes to mimic shallow surface early ocean waters. The volume is very small which allows me to test many different combinations and conditions at the same time.”

THANKS

In addition to Jennifer Glass and Chris Reinhard, Szeinbaum wanted to express her gratitude to the Alternative Earths team that hosts her as an NPP fellow and the Astrobiology community at Georgia Tech which has been extremely supportive of her research.

“There’s a lot of effort in communicating between different disciplines at Georgia Tech, and that collaboration has inspired me to come up with these ideas for the NPP,” she said. “I am very grateful for everybody here.

“The NASA Astrobiology community is very welcoming to scientists new to the field, and very supportive of ExplOrigins, a new early-career community at Georgia Tech. I’m working with many ExplOrigin members, early career astrobiologists around the world, to develop a new edition of the Astrobiology Primer. It has been a lot of fun.”

OUTSIDE THE LAB

When she is not donning her lab coat, Szeinbaum enjoys playing music and spending time with her family. She also does Astrobiology outreach in the community and teaches meditation.

“People like to explore,” said Szeinbaum. “One way is exploring outer space. I think that digging into our microbial past is like that for me. Thinking about nature at the micro level—beyond what we can see—it is my way of exploring.”
Research Highlights and Awards

Planetary Science
Natalie Curran
Goddard Space Flight Center
Advisor: Barbara Cohen

Natalie Curran was part of the preliminary examination of a recently opened, never before studied, Apollo 17 drive core. The work is taking place at Lunar Sample Laboratory Facility at NASA Johnson Space Center, home to the world's collection of Apollo samples. This work is part of the Apollo Next Generation Sample Analysis consortium of scientists chosen to study the core. Her team from NASA Goddard Space Flight Center will analyze the noble gases in particles from the core to understand its regolith history.

Earth Science
Chris Milliner
Jet Propulsion Laboratory
Advisor: Andrea Donnellan

Chris Milliner and Andrea Donnellan published a study using optical satellite imagery that uniquely separates the timing of surface fracturing during the 2019 Ridgecrest earthquake sequence. This sequence was comprised of a Mw 6.4 foreshock and a Mw 7.1 mainshock, the latter the largest event to have occurred in the contiguous US in 20 years. The satellite data provided by this study will help understand the possible triggering process and have implications for seismic hazard analysis.

Biological Sciences
Rachel Gilbert
Ames Research Center
Advisor: Sharmila Bhattacharya

Rachel Gilbert published an article in Nature Microgravity featuring her NPP work, titled "Spaceflight and simulated microgravity conditions increase virulence of Serratia marcescens in the Drosophila melanogaster infection model." The article can be found here: [https://www.nature.com/articles/s41526-019-0091-2](https://www.nature.com/articles/s41526-019-0091-2)

Astrophysics
Christian Malacaria
Marshall Space Flight Center
Advisor: Colleen Wilson-Hodge

Christian Malacaria and the GAPP team just had a landmark paper accepted for publication in the Astrophysical Journal that represents a review of the last 10 years of operation of the Fermi-GBM telescope. It is a big thing! This is one of the milestones of the telescope's literature. It will be important for students worldwide and for all the experts interested in the data, because it represents one-of-a-kind review of all available data on accreting X-ray pulsars observed with Fermi-GBM. It goes beyond the separation between innovative vs incremental: it is a review that shows with practical examples all the most important scientific objectives that GBM data can drive in this research area.
Sergio Sejas

**What are you doing now?**
I am still working at NASA Langley Research Center, but I have transitioned to a contractor position with Science Systems and Applications, Inc. (SSAI) working as a Research Scientist.

**How did you get from NPP to your current position?**
Through my NPP experience I was able to demonstrate my abilities, capabilities, and work ethic to not only my NPP advisor but other Civil Servants in the Climate Science Branch, who then encouraged me to apply to my current position as they thought I would be a good fit.

**What was the transition like?**
The transition was facilitated by the fact I would remain at the same location. My new position, however, required me to perform different tasks than my NPP position, which has led to a bit of a learning curve in these first few months but at the same time has been a great learning experience and welcome challenge.

**How did NPP help you?**
The NPP fellowship provided me the opportunity to work with and prove my worth to NASA scientists within the Climate Science Branch, while allowing me to further myself as a researcher.

**What advice do you have that is unique from your perspective as a three-month NPP alumni?**
I wish I had realized how rapidly the two to three year time period of an NPP fellowship goes by. It is easy to get too focused on your NPP research topic and lose track of time. Though it is not easy, one must develop a plan to not only do great research but also to prepare for the next step after the NPP.

To achieve the next step, you might need to write a successful research proposal, or if applying to a tenure-track faculty position, write effective research and teaching statements. Successful research proposals and applications for tenure-track faculty positions require excellent writing, lots of time and practice.

Therefore, in the first year of the NPP fellowship—or as early as possible—I would encourage NPP fellows to volunteer for proposal reviews—NASA has many—to gain

**Easy as Pi**

**NPP Alumni of 3 months, 1 year and 4 years share a slice of knowledge**
You asked, we listened. We caught up with three former NPP postdocs and are reporting back on where they are now, how they got there and what they learned along the way. We have the scoop on how they transitioned from their postdoc to their current positions, how they were able to successfully use the experience and knowledge they gained as an NPP in their respective careers and are serving it up along with their valuable advice on how to make the most of the NPP fellowship in order to help make things easy as pie for you.
insight into what successful proposals look like and the many reasons why unsuccessful proposals get rejected. For those seeking faculty positions, do research on the keys to writing successful faculty applications and perhaps apply to faculty positions in your second year to gain valuable experience that, if rejected, could prove to be the difference when applying for faculty positions in your third year. As for those seeking to remain at NASA, it is never too early to integrate yourself within your branch and allow those around you to realize the value you bring.

What advice do you have that is unique to your perspective as a one year NPP alumni?

Don’t forget your NPP tax slips when filing your tax returns!

What career lessons/advice would you share with current postdocs?

1 year

Jason Hofgartner
What are you doing now?
I am a research scientist at the Jet Propulsion Laboratory, the center I was at for my NPP. I am continuing my research of active geologic processes in the outer solar system, my contributions to the New Horizons mission. I am a co-investigator on the Trident concept to Triton that was recently selected for Step 2 of NASA’s Discovery program.

How did you get from NPP to your current position?
Lots and lots of hard work! I published papers during my postdoc, won proposals, helped with mission and projects and was offered a contract to continue my work.

What was the transition like?
Since I stayed at the same center, the transition was fairly smooth. Nonetheless, it was also still plenty stressful. My wife and I had a baby near the end of my postdoc and I didn’t get the final paperwork for my contract until the last minute.

How did NPP help you?
The NPP gave me the support during my postdoc to do my research, which was critical to getting a contract afterward.

What career lessons/advice would you share with current postdocs?

Publish, publish, publish, but you already knew that! Another piece of advice is to not underestimate how much effort it takes to find a position after your postdoc. Applications and proposals are both huge efforts, so start early.

What advice do you have that is unique to your perspective as a one year NPP alumni?

Don’t forget your NPP tax slips when filing your tax returns!

What career lessons/advice would you share with current postdocs?

4 years

Queenie Chan
What are you doing now?
I am currently a Lecturer at Royal Holloway, University of London

How did you get from NPP to your current position?
I have had another postdoc position for three years at The Open University, UK, before taking up the lectureship position.

What was the transition like?
The transition was challenging, because academic positions are extremely competitive. Thanks to the research experience I had at JSC, and the research network I have established with the help of my JSC colleagues, the transition has been very smooth. My research at JSC has received media attention which has given me a lot of opportunities to share with the public what my research is about.

How did NPP help you?

NPP is a comprehensive postdoctoral program that helps to equip an early career researcher. Not only does the program provide a fellow with an opportunity to work with NASA researchers on projects that lead the trend of space science research, but also allow a fellow to travel (fully-funded) and talk about their research on numerous occasions nationally and internationally. I have also had the chance to know good friends (some are also NPP fellows) at work who share similar interests and enthusiasm in planetary science as I do. These are the rare elements of NPP that are not commonly offered by other research opportunities.

What career lessons/advice would you share with current postdocs?

I cannot emphasize any stronger on what appears to be something rather simple - give it your best shot, and absorb as much knowledge, skill and experience as you can like a sponge. There are so many more ways to establish yourself other than the research project itself. The project helps you get started, but you should then discover other imaginative ways to further equip yourself. With the help from your NPP host, try to connect with as many professionals as you can to firmly establish your research network.

What do you know now that you wish you had known during your fellowship?
One thing I would blame myself for not realizing soon enough is now quickly time goes by when you are enjoying it.

What career lessons/advice would you share with current postdocs?

As an NPP fellow 4 years out from the program, the one thing that I can comment on is whether the NPP seed has planted a career for me. In my experience, for certain I would say yes. This ‘transitional stage’ was not easy, in particular in my case where I had to move to a different country and brought a new little life to this world - I think these could probably be fairly common as roughly this is the age when these things happen. Many people told me to be persistent, and at some point I did doubt if that might just be some big words that are easier said than done. However difficult it could be at times, I truly believe that I wouldn’t be as tough as I could be if I haven’t had experienced the challenges.
Fun Fact

NPP Fellows in the News
Sarah Bang
*Marshall Space Flight Center*
*Advisor: Daniel Cecil*

While teleworking and isolating at home, NPP fellow Sarah Bang heard about a movement of people putting up strings of holiday lights to cheer up those at home, in quarantine, or sick. Bang made a heart out of lights on the balcony of her Huntsville, Alabama, apartment. The movement caught the notice of several news outlets, culminating in the heart lights appearing on the Today Show, with Hoda Kotb reading the caption: “I hope to remind the world that there is still light and hope.”

Here are a few of the news outlets that also featured Bang’s gesture:

NPP Policy Highlight

Not sure how to acknowledge the NPP? NPP Policies and Procedures provide guidance for appropriate acknowledgement of the NPP on reports and articles.

https://npp.usra.edu/policies-procedures/index.shtml#reports

NASA Postdoctoral Program

7178 Columbia Gateway Drive
Columbia, MD 21046

Call: 888-811-1164
E-mail: npphelp@usra.edu

Website: npp.usra.edu