SPACE LIFE SCIENCES TRAINING PROGRAM

NASA Ames Research Center

Moffett Field, California

Summer 2021

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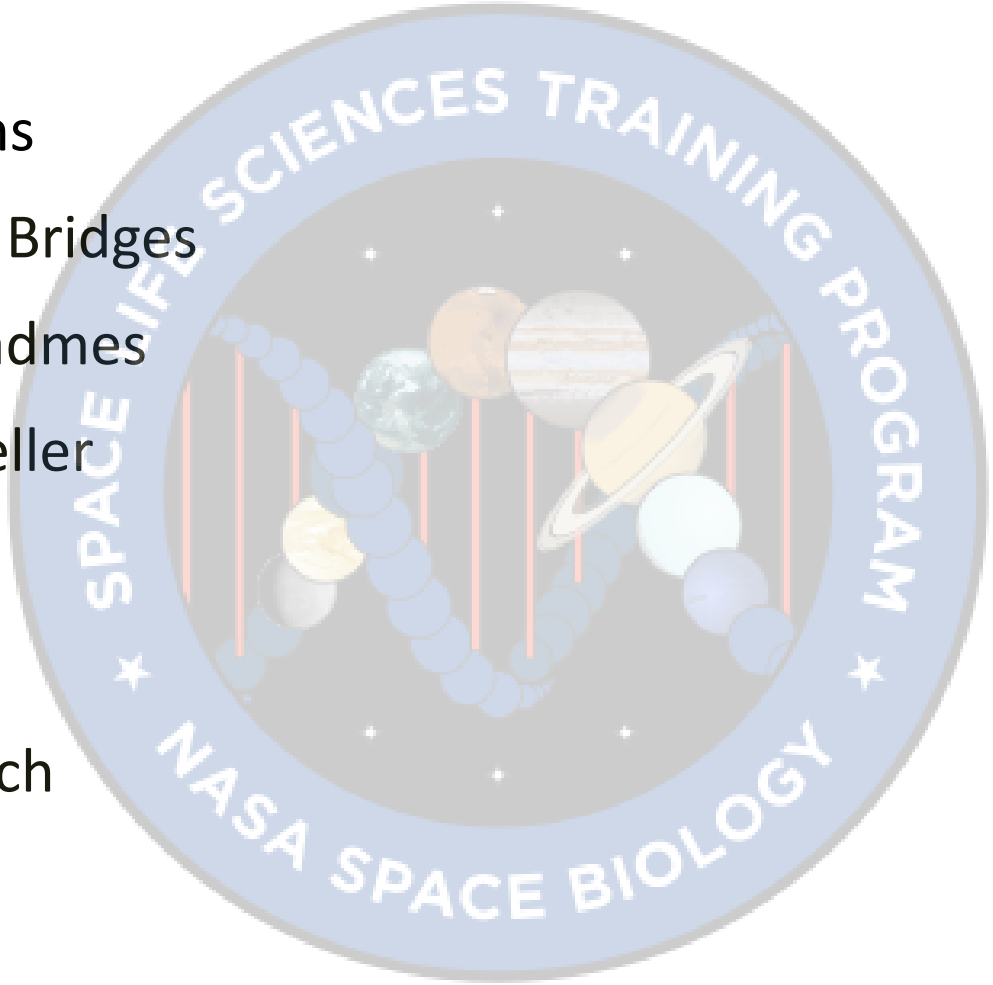

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Introduction

The NASA Ames Space Life Sciences Training Program is a unique summer institute of higher learning. The objective is to produce technically skilled scientists and engineers with the potential to become leaders in the U.S. space program by providing a glimpse into the many disciplines that are required to conduct biological research in space. The success of the Space Life Sciences Training Program is a result of the interaction of government, academia, and the private sector with each sector playing an essential and different role in the program.

NASA's charter, written in the 1958 Space Act, gives NASA the main role of using and exploring space for the betterment of humankind. Congress and the President have supported and directed NASA as its programs have evolved. President John F. Kennedy's challenged the country and the agency to put a man on the Moon by the end of the 60's. Neil Armstrong's first steps on the moon proved that the US and NASA were up to the challenge. Since Apollo, the Skylab missions, the Space Shuttle, and now the International Space Station have shown that humans can continually live in space and travel to and from space on a frequent basis. Unmanned satellites such as Kepler, Hubble, and Galileo have expanded our understanding of the universe. Aeronautics research is a continuing endeavor, producing technologies that allow aircraft to fly faster, farther, more efficiently, and more quietly.

As part of the human exploration mission, NASA conducts biological research. NASA studies how traveling into space affects humans and other living organisms. Astronauts experience bone and muscle loss, as well as a range of other physiological changes. Mice and rats exhibit similar changes, while bacteria become more virulent. Plants grow differently because of the absence of gravity. Researchers throughout NASA are studying life in space, defining ways to make space travel safer for astronauts, and the fundamental mechanisms that trigger the changes in living organisms. Biotechnology research is also important to NASA. The agency looks at bioengineering organisms to perform critical functions on a space mission, such as life support and food production. Recent advances in biotechnology are giving researchers insight into how genomic data is different for life in space.

Ames SLSTP Program Structure

NASA Ames Research Center (ARC) is located at Moffett Field, CA in the heart of Silicon Valley. It offers new insights about the universe, planetary systems, and the life sciences. Technologies developed at NASA Ames enable exciting new ventures in aeronautics and space exploration and have impacted quotidian life on Earth. The results from research at Ames have significantly influenced national and international policy, enabled most of the major space missions of the past thirty years, and contributed science discoveries and engineering insights that have revolutionized fields. In the process of these endeavors, Ames has made numerous contributions to environmental protection, public health, and the nation's economic well-being.

Ames is a pioneer in the application of the multidisciplinary approach in science, technology, and projects. Multidisciplinary approaches are flexible and tend to stimulate innovative concepts. Successful application of this technique requires a deep appreciation for the talents, skills, and insights of individuals. Today, more and more scientists and advanced technology industries are using this approach with remarkable results.

It is in the spirit of shared discovery and the synthesis of diverse talents that Ames offers the NASA Space Life Sciences Training Program. Students contribute to all aspects of successful multidisciplinary research on Earth, be it: in the air or in space. They experience the entire project process including the formulation of an idea, the procurement of goods and services necessary to develop it, the management, marketing, and manufacturing necessary to turn their concepts into reality.

The SLSTP at NASA Ames is based on an extremely successful program begun at NASA Kennedy Space Center called the NASA Spaceflight and Life Science Training Program in 1985. The Kennedy SLSTP begun under the leadership of the late Dr. Gerald Soffen, former Director of the Office of University Programs at Goddard Space Flight Center. The Ames SLSTP is unique in that it focuses on integrating the expertise of multiple disciplines into the space life sciences to gain a better and more comprehensive understanding of what is taking place today in the Space Program and thus, mold its future.

SLSTP at NASA Ames provides opportunities usually unavailable to those outside and within the Agency. The objective of the program is to expose research associates to various aspects of NASA and the Space Program. Topics include, but are not limited to: current research projects, developing the unique tools necessary for discoveries in space, tracing the progress of an idea from concept through completion, technology development through flight operations, data analysis to publication, the acquisition and communication of knowledge and its impact on science and society.

In 1993, the first SLSTP was formed at Kennedy Space Center. Twenty students, undergraduate and graduate, took part. Due to its success it was duplicated the following year, adding four more students and a staff member to the program. In 2013, NASA Ames restarted the Space Life Sciences Training Program to support biosciences research at the center. As Director, Sigrid Reinsch heads the SLSTP at NASA Ames. Hami Ray, Desireemoi Bridges, and Elizabeth Keller are also a part of the SLSTP Management Team.

SLSTP is designed to operate as a joint effort with equal input, ideas, and energy coming from both the SLSTP Management Team and the research associates. The group meetings and discussions form part of the experience, which will help to shape SLSTP to your specific goals and interests.

The program runs from the second week of June to the third week of August. These dates were selected to give most students a respite before returning to the complexities of school life. This is a compromise as no two schools have identical schedules. It is important that the students commence and complete the program together. The success of the SLSTP ultimately depends on the students. The program does not accept people who are not able to attend this entire period. All students must be U.S. citizens or residents.

One goal of SLSTP is to ensure that the students interact as a “team.” Activities spark the development of each student’s leadership qualities. During non-remote program years, all students are housed in apartments at the NASA Ames Exchange Lodge. Transportation is provided each day and for weekend activities.

The students go on several trips on the weekends. These include trips to the other NASA Centers, such as the Jet Propulsion Laboratories and the Armstrong Flight Research Center. Shorter trips to Lawrence Livermore Laboratories, Monterey Bay Aquarium Research Institute, and other areas of interest in the West are also made. The students plan additional weekend trips when they arrive. Each of the ten weeks are a unique group experience, but at the same time the student are working on a research project with investigators in the Ames’ laboratories or on the group projects.

Student Eligibility

To be eligible for the Space Life Sciences Training Program, students must:

- demonstrate an interest in space biosciences
- be enrolled as a junior, senior, or entering graduate student as of June 1 of the program year
- maintain a minimum 3.2 cumulative GPA
- concentrate in science (physics, chemistry, biology, etc.), math, engineering, computer science, or other areas of interest to the space biosciences
- be a US citizen or permanent resident as of June 1 of the program year

Contact Information

NASA Space Life Sciences Training Program information can be obtained through: www.nasa.gov/ames/research/space-life-sciences-training-program

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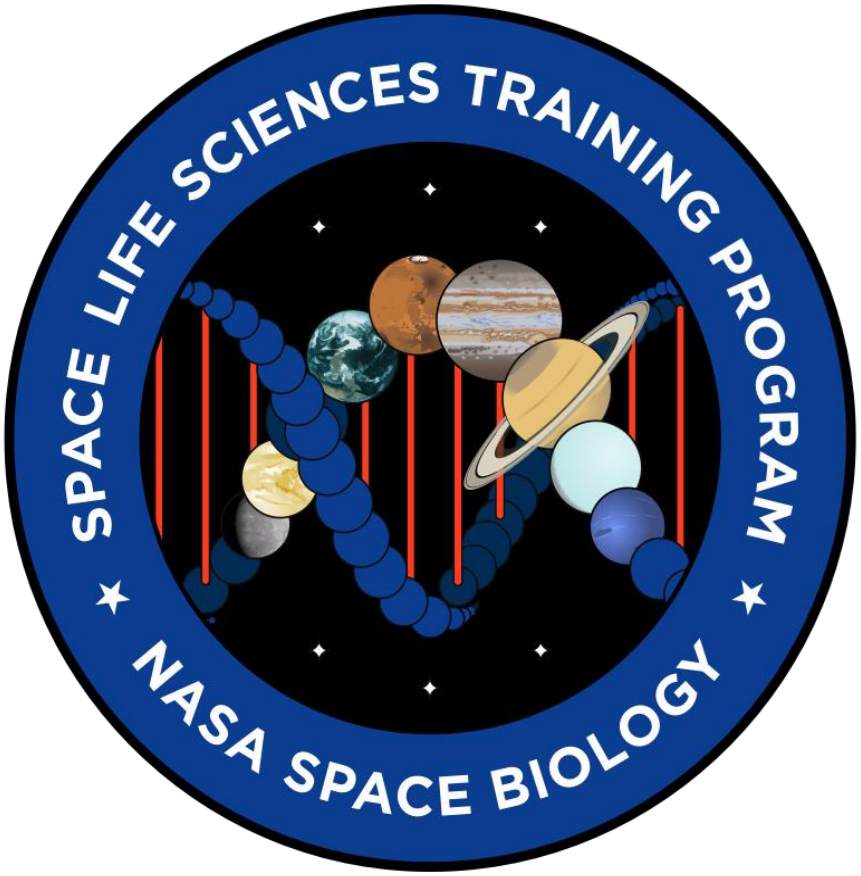
2021 Research Associates



Rocky An

Project: Microbes in Microgravity: Stress Response and Population Dynamics

Cornell University

Major: Mechanical Engineering

PI: Jessica Lee

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I was born in Colorado and raised in California, Texas, and New Mexico. One thing common to the whole southwest is the abundance of stars and clear, dry, night skies. I remember one night after gazing at those stars, spotting a bioluminescent worm in the grass. I became way more captivated by it, a single glowing green speck that had fallen from a hundred of such stars that I saw above.

I enjoyed sci-fi movies, shows, and books but I had no idea what careers existed at the intersection of space and biology, or even biology and engineering. I enjoyed working with computers but did not know computational biology was a thing. Not until the summer before my last year of high school did I realize my passion for engineering. After failed experiments for my biology class research project, I was inspired to develop a new fluorometric method to measure coculture population dynamics. I was funded and advised by the Cornell University ASSET K-12 educational program.

In October of my first year at Cornell, I joined Dr. Theodore Clark's research lab, which headed the ASSET program. That same month I also joined my university iGEM (international Genetically Engineered Machine) synthetic biology team. Although I entered Cornell as a bioengineering major, space science continued to captivate me. I ended up working on rocket projects my first year. Because of that, I added the mechanical engineering major because I saw the potential application of mechanical engineering tools to aid in biological research. Since this year, I have shifted my research to the application of coupled CFD-DEM modeling to simulate the mechanobiological properties of microbes.

In my free time I enjoy bicycling and guitar. I like to work on bicycles and used to volunteer at a local community bike rescue. I am very interested in microtonal, traditional, and world music and have created microtonal transcriptions of my favorite songs on the guitar. I also enjoy being a member of the Beta Theta Pi fraternity, Cornell Chapter. Although I had plans to do research last summer, I instead interned for the Asian Pacific Islander American Public Association (APAPA), working to improve the involvement of people of color in the Black Lives Matter movement and increase their representation in the United States Census. I also set up 3D printers for local summer camps because I wanted to inspire children in my community to pursue STEM.

Conducting science outreach and creating educational programs is one of my major goals as a college student because I had almost never participated in any such programs, if not for my last year of high school. Last year, I supported the Cornell University ASSET program in addition to research work in Dr. Clark's lab. This year, I have become an iGEM Ambassador to North America. In iGEM, I hope to expand synthetic biology educational opportunities to high school students. As an SLSTP research associate, I am very excited for the opportunity to work with Dr. Jessica Lee in contributing to NASA's public outreach efforts and applying my engineering skills to space biology. Lastly, I cannot wait to work as a team with my amazing peers this summer!

University of Texas Dallas

Major: Biochemistry

PI: Jessica Lee

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Katie Blackwell

Project: Microbial Bioinformatics Toolkit: GeneLab and Outreach Applications

My fascination with natural and physical sciences began early. For my seventh birthday, I begged my parents for a telescope, which I still use as a hobbyist today. I soon added a microscope and chemistry set to my childhood collection. In high school, I admired the beauty and wide applications of the biological sciences, particularly in the realm of human spaceflight. Foremost, I wondered how research impacted the general public. Where does the pursuit of knowledge connect to the common good? I carried this curiosity with me into college.

Throughout my undergraduate years, I participated in a variety of research projects, surveying the breadth of the bioscience field. In the lab of Dr. Sheena D'Arcy at the University of Texas at Dallas, I researched the structural details of nucleosome assembly proteins. I spent the summer of 2018 at UC San Francisco under the supervision of Dr. Stephen Floor, studying the impact of stress granule nucleating proteins on cell fitness. In the summer of 2020 at MIT, I investigated the impact of the COVID-19 pandemic on learners in an online introductory biology class. From structural biology to cell biology to biology education, I often asked: What aspects of my work are interdisciplinary? How does this research apply to medicine, engineering, and space?

I dedicated just as much time teaching and mentoring as I do in the lab. I have served as a peer tutor for freshman chemistry, trained in STEM secondary education, and volunteered for women-in-STEM outreach programs. To me, research and outreach come as a package deal. Whenever possible I integrate my work in the lab with outreach initiatives. In my spare time, I enjoy reading and writing speculative fiction.

I have long dreamed of combining my passion for space, biology, and outreach. I am excited and honored to join the NASA SLSTP team as a research associate. I know that SLSTP is a singular opportunity for me to advance my career goals as a researcher and educator and I will carry this experience with me as I pursue my Ph.D. in Biology at MIT starting in fall 2021.

Nadjet Cornejal

Brooklyn College

Major: Biology

PI: Craig Everroad

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Project: Experimental Evolution in the Spaceflight Environment

Instead of pursuing college like many wide-eyed, eager students straight out of high school, I took a non-conventional route. I decided to help make my family's living situation become more financially secure and entered the workforce. While working an average of 60 hours per week in the food industry, I cultivated my ability to be patient in fast-paced environments and the value of camaraderie while functioning as a cohesive team. It inspired me to continue to further my education and attend college.

However, I was conflicted; I didn't know what to study. While trying to decide what to major in, I decided to attend a bioethics seminar centering around CRISPR technology at Rockefeller University. While listening to the workshop, I noticed people of different disciplines contributing to the conversation in distinct ways; gene therapists and professors of philosophy and ethics alike both brought strong points of view that fascinated me. I saw and felt a strong sense of community, and I knew I wanted to be part of it. It was at that moment that I recognized I wanted to pursue biology and become involved in research.

Currently, I am a student at Brooklyn College, where I am a Maximizing Access to Research Careers (MARC) scholar. I have had the opportunity to work on different research projects at the Population Council's Center of Biomedical Research at Rockefeller University and Borough of Manhattan Community College's research facilities. The projects I have worked on include embryonic development in invertebrates, plant biology, and virology. I have studied the fertility and developmental biology of model organism Lytechinus variegatus sea urchin embryos. I hypothesized that triclosan would have harmful effects on sea urchin embryos and give us insight into early human embryonic stages.

In addition, under Dr. José Fernández-Romero's guidance, I have generated, collected, and analyzed data for potential microbicide formulation and antiviral compounds to identify those that are safe and efficacious against HIV, HPV, and HSV. I have also been testing plant extracts with potential antiviral properties against SARS-CoV-1 and SARS-CoV-2 pseudoviruses.

I am excited to be part of the 2021 SLSTP cohort and expanding my mental frontier about how and where biology can be done. In particular, I'm curious about learning how bacterial species may affect future space exploration. I am looking forward to working with Dr. Craig Everroad and my SLSTP peers.

University of California Los Angeles

Major: Microbiology, Immunology, and Molecular Genetics

PI: Jonathan Galazka

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Alicia Gibbons

Project: Space Systems Biology

Those nights were warm and dry, full of laughter and silly jokes. Punctuated by a large starry sky outlined by reaching cacti, my triplet siblings and I would talk about what we wanted to be when we grew up. The three of us knew we were distinct, with our own ambitions and dreams, even when those around us constantly confused us. For me, this meant that I wanted to be a biologist. I wanted to know more about us -- why were we different and yet so fundamentally alike? But the night had an effect on me too, and even in those days I needed to know about the stars.

I didn't yet have a name for astrobiology, but my hobbies demonstrated that it was my passion. I loved science fiction and spent so much time playing games where I was an alien, or better yet, could design one. I read about other planets and how, just maybe, some strange little microorganisms would call it home. I thought about how I would design spacesuits and what it means to be a human in space.

My enthusiasm for astrobiology grew in high school. During my lunch breaks, I would watch amazing space broadcasts and become completely lost in thinking about distant worlds. However, I was living in a small New England town of ten thousand people, and often felt that I too was somewhere distant.

When I began college, I realized I was passionate about science accessibility. Even though I had felt far from the world of science, most of the world was even further away. I was pursuing biology but space still gnawed at my brain, so I supplemented my studies with a spoonful of space and a large dollop of science advocacy.

At UCLA, I am a third-year Microbiology, Immunology, and Molecular Genetics student. I adore learning about the natural world and its complexity, and my classes support this love. Outside of class, I work to enhance our university's science community. I joined the Life Science Student Association to help disseminate life science opportunities and foster a science-minded society. I review articles for the UCLA Undergraduate Science Journal to honor my peers and help spread science knowledge. I have also been an undergraduate Learning Assistant to provide a student mentor in a biodiversity class.

My passion for science accessibility was spurred by my research. I have been involved with CALeDNA, an open community-science environmental DNA biodiversity organization, since my freshman year. I collected environmental DNA samples, cleaned and sequenced them, and performed community-wide data analysis to describe biodiversity trends at different sites in California. My mentors' passion for open-science has inspired me to become a scientist who strongly advocates for science availability.

In addition to these activities, I have been involved in space opportunities. I joined UCLA's undergraduate space engineering club, Bruinspace, and there participated in NASA's space challenges. I also volunteer on the community science website Zooniverse, contributing my free time to mostly space-related scientific endeavours.

During those nights with my siblings, I could never have imagined where I would be now that I have grown up. However, I do know that little Alicia would be incredibly impressed. Being able to intern at NASA's Space Life Science Training Program means that I will be able to explore my passions for biology, space, and open science together. If she could put it into words, this is exactly what she would have wanted to do, too.

Tufts University

Major: Biology

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Bijan Harandi

Project: Improving Data Analyses for a Biological Mission to Deep Interplanetary Space

Ever since I was little, I've had an immense passion for Astronomy. For example, I had a miniature solar system next to my bed that I would stare at all night, along with an Astronomy encyclopedia. I was especially captivated by pictures of galaxies taken by the Hubble Telescope. The sheer size of the universe with its countless celestial bodies, while being scary for many, filled me with excitement and awe (and still does). To me, a whole colorful universe was just waiting to be discovered. As I got older, I delved greatly into Biology, specifically evolution, the origins of life, and genetics. As time went on, I started to become more interested in the mechanisms of life and how we went from amino acids to humans in a relatively short time. As my knowledge in the field of biology grew, I gained an additional passion.

During high school, I continued my passion of astronomy alongside biology by watching shows such as Cosmos, listening to StarTalk Radio, and attending talks by notable Astrophysicists. At that point, I was introduced to Astrobiology and the Space Biosciences, which perfectly combined my passions for both biology and astronomy. I realized that while discovering new celestial bodies is important, nothing would be more revolutionary to humanity than the discovery of extraterrestrial life or colonizing new worlds ourselves. Given this, I decided that this would be a promising and fulfilling field for me to pursue. Attending University and finding a place to pursue this, I have never felt more at home.

My first research experience was in an Immunology laboratory at Tufts University, School of Medicine working on host immune responses to *Schistosoma mansoni* throughout high school. Starting college, I was awarded a Laidlaw Scholarship to work in the lab of Samuel Kounaves, performing Space Bioscience and Astrobiology research. One of my two current projects revolves around extremophiles and Martian Simulants (JSC-1, MMS, and P/S-MRS). My second project is augmenting Ion-Selective Electrode (ISE) chemical sensors for icy worlds, previously used on the Phoenix Lander, whose wet chemistry division was spearheaded by Professor Kounaves. These chemical sensors, a component of the Microfluidic Icy-World Chemistry Analyzer (MICA), funded through COLDTech and ICEE-2, will be used on the Europa Lander and the Enceladus Life Signatures and Habitability (ELSAH) spacecraft. Furthermore, I am in process of writing an academic review on microorganisms in astrobiological settings. I simultaneously work in the Moazed Howard Hughes laboratory at Harvard Medical School, investigating heterochromatin and epigenetics of *Schizosaccharomyces pombe* and *Saccharomyces cerevisiae*. Here, I am utilizing bioinformatics software to determine the link between CpG islands and Polycomb target genes.

Outside of academics, assembling the brightest students on my campus, utilizing their skills and expertise to promote competition and scientific research, is a staple of my undergraduate experience. Firstly, I am Editor-in-Chief of the Breakthrough Research Journal, the flagship interdisciplinary research journal at Tufts, where I manage student teams to report ongoing campus research for annual publication. Secondly, I am founder and President of the Quiz Bowl Club, where we compete in academic tournaments. Lastly, I am head of the Tufts Venture Capital Investment Competition (VCIC) team. Throughout these experiences, I've learned that that the key to harmony within teams is promoting respect among one another, ensuring maximum success.

I am honored to be part of the 2021 cohort for the Ames SLSTP program, and more importantly to be part of a group of students I know will push the United States and humanity overall closer towards the cosmos. Working on the BioSentinel Project, I hope to use my skills in microbiology, yeast genetics, and chemical sensor technology to ensure that the payload is where it needs to be for its November launch. Furthermore, I look forward to connecting with the rest of the SLSTP team, creating an impactful group project in the process.

University of Florida

Major: Microbiology

PI: Jared Broddrick

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Iris Irby

Project: Conservation of Stress Response Genes Versus Metabolism in Spaceflight Relevant Microbes

Like a scene out of Home Alone or Night at the Museum, when I was five I was left at NASA's Kennedy Space Center. My school group went back home on the buses, but I wanted to stay longer so I had the bright idea of hiding from my mom who was chaperoning the trip. She eventually came and found me, squandered my young fantasy of living in one of the model rockets, and we headed back on a city bus. Unbeknownst to her or the rest of the class, by the time I sat down on that bus my dream for studying space had been cemented in my mind and my eyes were firmly planted on the stars for the ride back.

Once I entered high school, I decided I also wanted to study the complete opposite of the massive expanse of the cosmos and learned about microorganisms. I was able to complete an independent experiment on antibiotic resistance on beneficial bacteria, and was fascinated by the harm and good that microscopic organisms can do and the huge effect they have on the world around them. I also found that I loved the experience of performing scientific research, and uncovering different answers to form a larger solution to a problem.

I followed this love of research to the University of Florida, where I immediately got involved with statistical research which led to an internship at Johns Hopkins All Children's Hospital, where I continued using statistics to display discrepancies in the medical field. These research opportunities led to my third great passion in life, which is using technology to answer biological questions. This newfound interest led to my current research with Dr. Apichai Tuanyok, where I study the pathogenic bacteria *Burkholderia pseudomallei*. My current project involves organisms smaller than before, as I am identifying all viruses found in the genomes of all strains of the bacteria. This research combines work in the lab with bioinformatics work online, which I have found gives me the most opportunities for success in my research.

All of these passions led to me majoring in Microbiology and Cell Science, with a minor in Bioinformatics and Pathogenesis with the overarching goal to study the impact of bacteria on space environments. I aim to earn my Ph.D. in microbiology or bioinformatics and continue performing scientific research. I also love to read, paint, volunteer, and travel the world trying new things. I also love to teach, and have been a teaching assistant for a microbiology laboratory and a Director of the Center for Undergraduate Research Board of Students at UF.

Working for NASA has been one of my largest goals in life, and I am extremely excited to be a research associate for the SLSTP at NASA Ames Research Center this year. I am beyond honored to be working on such innovative research and cannot wait to see with this opportunity brings!

Clemson University

Major: Biology

PI: John Hogan

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Amy Rees

Project: Microbial Factories for Solar System Exploration

One otherwise miserable day out sick with strep throat in the sixth grade, I happened upon the NASA TV channel. A vast departure from the usual absurdity that is daytime television, this station immediately caught my eye, and I sat captivated as space shuttle Discovery approached the ISS for several hours. While many would compare this activity to watching paint dry, I was hooked and ready to spend the rest of my life admiring the stars.

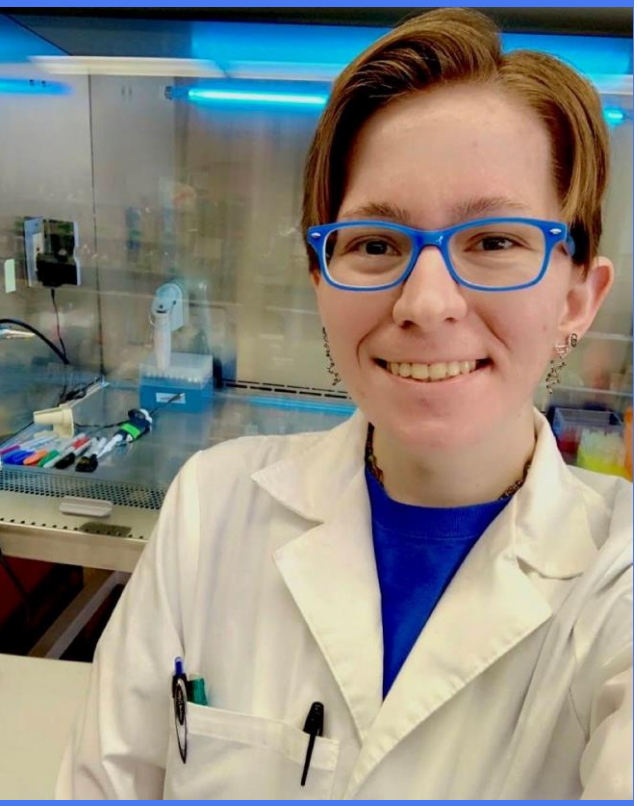
When I started at Clemson University four years ago, I was overwhelmed by this pressing need to lock in a career path. I knew I liked biology, but I wasn't ready to let go of my other interests. So, it became my daunting mission to figure out a way to pursue them all at once. Discovering the field of space biosciences was truly a revelation for me. This field speaks to every element of my curiosity about the universe and provides opportunities to pursue endeavors like research and field work, but also writing and speaking to share ideas with the public.

My junior year I began undergraduate research studying yeast metabolism and how we can engineer their genomes to aid in the breakdown of food and plastic wastes. This opportunity really showed me that earth-based research can easily be translated to space research with thoughtfulness and curiosity.

Outside the lab, I love writing and talking with others about science. Perhaps this is because the books I read and the shows and movies I watched were among the greatest inspirations for me to pursue a career in the space life sciences. I even quoted *Apollo 13* in my high school graduation speech. (Cringy? Maybe.) For the past several years I've enjoyed writing for the science column in my school's newspaper and participating in outreach programs that aim to bring topics like marine science, genetics, and evolution to elementary and middle school students.

Also, thanks to my Spanish major, I had the chance to spend a semester studying abroad in San Ramón, Costa Rica where I got to experience some of the earth's most beautiful biodiversity and grow my appreciation for biological sciences and conservation. Finally, in my free time I get the joy of performing at football games and other school and community events with the Clemson Tiger Twirlers.

As I enter SLSTP, I truly believe the vast complexities of biological systems rival those of the stars, but I would also argue that those miraculous complexities rival those of identifying one's ideal career path. I couldn't be more grateful for this opportunity to continue exploring research and the ideas that interest me most, and I look forward to emerging from this program with a network of brilliant and passionate peers and the confidence to cross the bridge from an interested outsider into a contributing member of the field of space biosciences.



Mount St. Joseph University

Major: Biology

PI: Egle Cekanaviciute

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Kristie Sattler

Project: Neuroimmune Outcomes of Deep Space Radiation

Hello! My name is Kristina Sattler, and I am currently finishing up my fourth and final year as an undergraduate student at Mount St. Joseph University in Cincinnati, OH. Beginning in biology classes in my first year as an undergraduate, I knew I had found the right field- I found my classes to be exceptionally fascinating and eagerly sought out more opportunities to immerse myself in the field outside the classroom. I joined the TriBeta Biological Honor Society, and I have held positions as a lab assistant in the Biology Department for nearly four years, and as a peer tutor in the Learning Center for 3.5 years.

Looking to learn more about the field of biology as an undergraduate sophomore, I joined the Crowe lab at MSJU, which studies the pathophysiology of neuromuscular disease. As I began to see biology in a new light through experimentation, I found my passion for understanding the molecular mechanisms of disease. My primary project over the past 2.5 years has involved using an *in vitro* model to assess potential therapeutic biomarkers for the rare muscle disease GNE myopathy (GNEM). The goal of this project is to find and validate a glycan-binding lectin as a consistent and accurate biomarker for GNEM through several methods. Specifically, we have assessed staining using a panel of lectins before and after enzymatic removal of sialic acid in human converted myoblasts, finding four candidate lectins that showed a striking difference in binding. Now, we are validating these lectins by rescuing the GNE gene (which is mutated in GNEM) via transfection in a cell line with this gene knocked out, and assessing the effects of alterations in SA production in a genetic model, which reflects the effects of GNEM in patients.

After completing my bachelor's degree, I would like to pursue a career as a biomedical research principal investigator. I am inspired to do so because I want to have the chance to ignite a passion for research in students the way I have been encouraged and supported by my professors during my undergraduate years. This summer, I am so incredibly excited to be participating in the Space Life Sciences Training Program (SLSTP) at NASA, working in the lab of Dr. Egle Cekanaviciute studying the Neuroimmune Outcomes of Deep Space Radiation, allowing me to further explore my passion for research in biology and space. After the summer, I am looking forward to beginning in my first year in the Molecular, Cellular, and Developmental Biology PhD program at Ohio State University in Columbus, OH.

In my free time, I like to read, watch my favorite TV shows including *Supernatural*, *Bones,* and *Fringe*, listen to music, and spend time with my cat and my family.

University of Pittsburgh

Major: Computational Biology

PI: Diana Gentry

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Tao Sheng

Project: Data Collection and Analysis for Biosignature Studies

Based on my earliest memories, I like to believe that I've always been curious and asking questions. Though at the time it was more along the lines of questioning why I just *had* to drink that glass of milk before school, I don't think that desire to fully understand the nuance of everything has faded one bit. What used to be me asking how firetruck ladders seemingly extended from nowhere somehow became me asking just how we know that we are the only life forms in our part of the observable universe. At the time, I thought it was simply a fun thought experiment; however, it quickly became the very thing that brought me to watch the NASA shuttle missions and learn about the agency that is searching for the answer to my childhood questions.

As of 2021, I am a rising 4th-year student at the University of Pittsburgh studying computational biology with Chinese and chemistry minors. My interests in biology, chemistry, and computer science stem from believing that technology can be the key to great discoveries that just a century ago, were hidden away. However, I also wish to become a physician in the future. This interest in medicine goes together with the idea that I could engage in a career that alters the path of people for the better — and that we do not have to be tied to our fate because we all have the power to change our future. This privilege, freedom, and ability to pursue a noble cause greater than myself is my absolute motivation in life. While a physician can produce great change on an individual level, I also wanted to be able to do the same for many more people. Here is where NASA's and my goal are the same – to benefit the people of Earth and improve humanity's quality of life.

I am a big believer that we stand upon the shoulders of those who have come before us. That is the other reason why I chose to work with NASA. There is no better agency that inspires the future generation of students to explore the cosmos, love the sciences, and learn to pursue their true passions. My job here is to be one step closer to becoming someone who can pass that culture on.

While thinking about the endgame is fun, enjoying the journey is equally important. That is why when I'm not studying, I love to listen to music, play chess and video games with friends, and bike around my neighborhood or go to the gym. On campus, I am a writer for the Pitt Political Review, a sabre fencer, a part of the co-ed pre-medical fraternity PhiDE, and an undergraduate teaching assistant for organic chemistry.

Words alone cannot describe my excitement to be a part of the 2021 SLSTP cohort this summer. I will be embarking on the most interdisciplinary project of my career – the SCOBI project spans topics such as machine learning classification to spectroscopy and to metagenomics. It absolutely is the perfect combination of all my interests, skills, and passions and I am forever grateful that I convinced myself to pursue what I firmly believe is my calling. I look forward to contributing to such an incredible project with even more incredible colleagues and support systems beside me!

Embry-Riddle Aeronautical University

Major: Aerospace Physiology

PI: Stephanie Puukila

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Olivia Siu

Project: Changes in Cognitive Performance and Behavior Induced by Spaceflight-like Environment

I always knew what I wanted to do, but I didn't know what job I wanted. Then I won first place in a digital art state competition. Then I was advised by prospective CIA to be a lawyer. Then the college counselor's career quiz sorted me as a Rockstar and a Biomedical Engineer (in that order!). But what those things had in common was problem solving in a creative way. The result being a refined product from an informed author. I chose to investigate the urgent needs of extreme-environment sciences to direct and train my strategic, but creative mindset.

I am personally dedicated to the setbacks that explorers encounter because growing up with a severely disabled family member, I knew to recognize the obstacles in the ordinary. The servicing intuition I needed in order to assist at home helped me resolve communication barriers in the collegiate laboratory and on international projects. With this insight and the courage of being the first, I was able to code an original Python program for a biochemical-assay stress response project that saved laboratory hours and cut down human error. Further literacy with data analysis and astronaut history landed me in a Master's level internship with the Human Performance In Space Department Chair at International Space University in France. Here, I was "face-to-face" with the international space research community whose curiosity and grit allowed for the safety and betterment of people in orbit and on Earth. And so, my strategic mindset and dedication to human safety zeroed in on the revision of spaceflight residential systems.

On the ground, I enrolled in a Life Support Systems course and was involved in both human and microbial spaceflight in-house studies at ERAU. With mentor support and this momentum in research, I was awarded national recognition as a 2021 Goldwater Scholar. Throughout these celebrations and investigations, the skill of and respect for foresight has kept me listening and kept me curious.

My next steps in the SLSTP continues the urgently needed work that is both receptive to technological advances and to spaceflight history. As I'm part of the 4th cohort of ERAU's Aerospace Physiology program, I'm excited to apply my education of how biology adapts to space… and how it doesn't. I personally look forward to work with animals as my repertoire is microorganism and human studies. As a fervent podcast and film fan and writer, I'm always looking for new ideas and conversations surrounding science and society.
Please feel free to reach out!

North Carolina State University

Major: Biochemistry

PI: Sergio Santa Maria

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Nick Syracuse

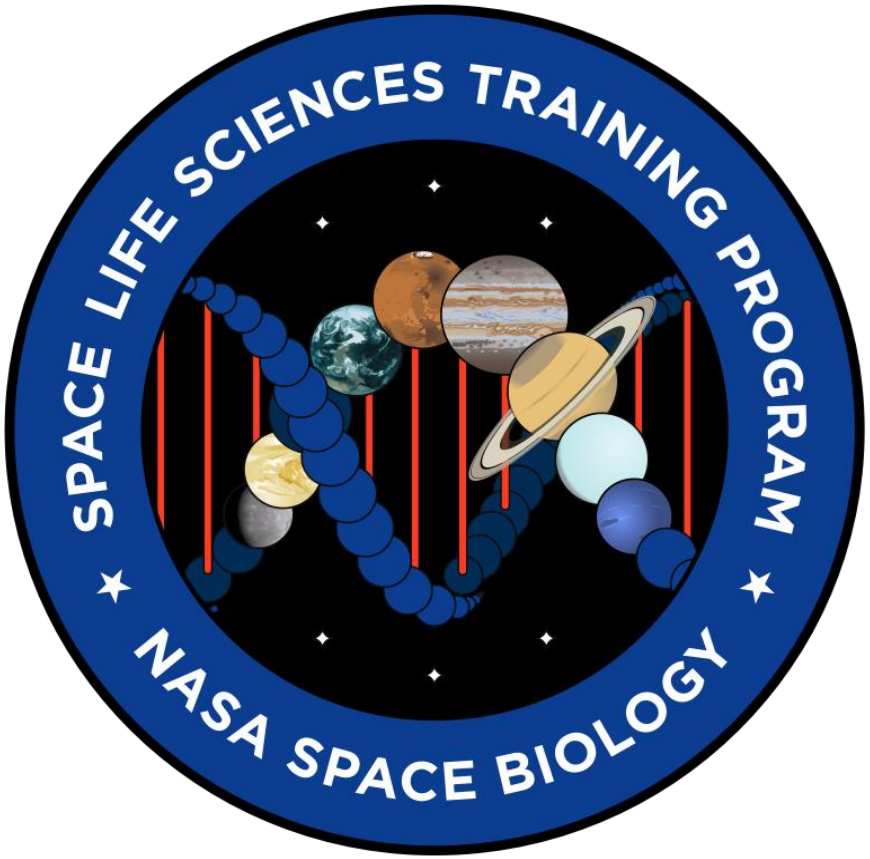
Project: BioSentinel and Other New Space Biology Technologies

I can still distinctly remember being met with the same confused, perplexed look on my neighbors' faces when I was growing up. Time and time again, it was just the same looks as they peered over the backyard fence. No one ever said anything, but their thoughts were nearly deafening: what in the world is Nick doing back there? Maybe it was bottle rockets, a crude attempt at a homemade telescope, or even a little bit of smoke and ash (a solar cooker for a school project went horribly wrong… or perhaps, horribly right?). Regardless of when it was, there was always some sort of experimentation going on in my backyard. I was fortunate enough to share the mischief with some truly incredible friends and family who made the experiences worthwhile, teaching me the importance of being curious and asking questions while simultaneously trying to keep me out of trouble. I like to think that many of the skills and friendships forged during those formative years helped influence my future endeavors. Well, besides the accidental fire-starting, perhaps. My excitement to question and learn certainly blossomed throughout my early academic career. At nearly every turn I sought to try a new subject, a new club, or a new hobby. I took a particular liking to math and science, an interest that would carry me well into my teenage years. By high school, I felt particularly keen about biology, but I still felt drawn to that questioning, tinkering, stargazing part of me that I felt so strongly as a kid. It was here that I discovered an interest in the intersection of both biology and the space sciences.

Unlike ever before, I had never felt quite so excited to be so unsure of my future. I had no goals whatsoever. I felt like a kid again, ready to try whatever was next. At my time at Rutgers University, I found myself deepening my connection with biology through work in the lab of Dr. Lawrence Williams, where we optimized and tested the parameter space of a computational and theoretical model used to predict protein folding behaviors. Upon transferring to NC State University, I dove headfirst into the space sciences through a number of great resources on campus, positioning me for my first work experience with NASA, supporting knowledge management ventures with NASA ARMD. Since then, I've had the incredible pleasure of being able to intern at Kennedy Space Center, supporting work at the Microgravity Simulation Support Facility, where I was part of a team working to develop and analyze literature databases to improve microgravity research.

I still sometimes wonder what my neighbors might say to me now. All I know for sure is that I'm unbelievably grateful. In addition to the many experiences, I have met some of the most amazing, supportive people in my life, and I have never felt more eager (and more thankful) to see what lies ahead. I am absolutely thrilled and honored to have the opportunity to participate in this year's SLSTP alongside even more influential peers. I cannot wait to see what we achieve and accomplish together!

2021 Staff & Management



Simon Ng

University of California Los Angeles

Major: Bioengineering

PI: Sergio Santa Maria

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Project: Yeast Hydrogel Encapsulation and Potential Space Biology Applications

I spent my childhood camping and backpacking with Boy Scouts and learning to canoe and rock climb with my family. On these excursions, I often felt grubby, itchy, and sore. What I didn't yet appreciate was my growing deep-rooted love for nature - for the scent of pine on a hot, dry day, the rustle of leaves in the evening breeze, and an endless expanse of dark, starry sky. My mosquito bites faded away, but my awe of the world around me remained.

When I wasn't outside, I was designing and building spaceships.... Well, they were made from Lego building blocks and only flew as high as my short arms could stretch, but they were the beginnings of my inner engineer.

In high school, my friends and I joined our school's research club, where we spent Wednesdays after school studying the effects of lead on learning and memory in zebrafish, a model organism for humans. I relished applying what I had learned in biology and chemistry class to our research, and it was exciting to think that we could make novel discoveries. I also joined my school's Engineering Club, where we spent Wednesday nights sawing, drilling, and hammering a bed-sized Rube Goldberg contraption into existence for a state-wide competition. Our Rube Goldberg was jerry-rigged to the max and never fully worked, but I was nevertheless delighted to steadily work towards our goal. Suffice to say, Wednesday was my favorite day of the week in high school.

I came to the University of California, Los Angeles for Bioengineering, a major which I saw as the perfect locus of goal-oriented design and applied science. Through four years of classes and research, I have become fascinated with synthetic biology and the potential of using biological tools as building blocks, my new Legos, to address pressing medical and environmental issues. Meanwhile, I have continued nurturing my love for nature through sustainability efforts at UCLA and by exploring nature throughout California and the American Southwest.

My passion for space exploration stems from those same roots I planted as a child. Apollo 17's Blue Marble photograph gave humanity a new perspective of the beauty and fragility of our shared planet. As we explore farther and farther from Earth, we gain a deeper understanding of ourselves and our home. I had the opportunity of a lifetime with SLSTP last summer to contribute to this exploration with my mentors, my fellow Research Associates, and the wider Ames community. SLSTP nurtured my love for space biology and sparked my first independently conceived research project, which combines my newfound understanding of space biology with my research background in biomicrofluidics. I am thrilled to return as a Staffer this summer to pursue this project with Dr. Sergio Santa Maria, to support SLSTP Management, and to help the Research Associates grow and learn. I hope to give them as fun and formative an experience as I had.

University of Colorado Boulder

Major: Neuroscience

PI: Diana Ly

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Ama Luthens

Project: Bion-M2 Project Management

From a young age, I had an infatuation with space. I watched all the Star Wars movies by the time I was 8 and as an elementary schooler I found myself attracted to the big space books in the library that were filled with pictures of nebulas, astronauts, and planets. A memorable day in my childhood was when my dad came home with a telescope. I remember standing out in our backyard with him on warm summer nights. He helped me adjust the telescope lens while listing off the biggest craters on the moon, his favorite galaxies, and the occasional space conspiracy theory. Looking back on those moments, I would never have guessed my infatuation with space would grow into something so much more meaningful.

I chose neuroscience as my major at the University of Colorado Boulder because of my fascination with the complex processes in the brain and my passion for behavioral neuroscience research. For the past three years, I have worked in a behavioral neuroendocrinology lab where I participate in a variety of experiments focused on topics ranging from immunology to the gut microbiome to finding new treatments for anxiety and depression. Outside of my neuroscience research, space has been my source of scientific inspiration since the end of my freshman year when I had the privilege of working for the Colorado Space Grant Consortium (COSGC) on a space biology project. For our experiment, my team and I measured metabolic changes in *E.coli K-12* during a weather balloon flight. My project at COSGC inspired me to apply to NASA Ames's SLSTP. In February of last year, I was selected to be a part of the 2020 cohort. Last summer, I worked with Dr. Linda Rubinstein on a behavioral neuroscience and physiology project titled, "The effects of Simulated Microgravity and PLacental-EXpanded (PLX-PAD) stromal cell treatment on the behavior and correlation with cytokine profiles in female mice". I am currently working on the manuscript for this project and we are hopeful it will be published soon!

When I am not in the lab or studying, you will most likely find me doing something active whether it be lifting weights, practicing yoga, or jogging on the myriad of trails at the famous Chautauqua park just a few blocks from my home. I also love painting and my bedroom walls are adorned with canvases full of stars, galaxies, and planets. And, of course, I always find time to spend with my family and friends!

This summer, I am excited to come back to SLSTP as a staffer. On top of being a mentor for the 2021 SLSTP cohort, I will be working with Diana Ly on the project plan for the Bion-M2 mission, an international collaboration with the Russian Space Agency. I am incredibly excited for this opportunity not only because I get to learn more about what it means to be a project manager and mentor, but because I get to inspire other students, guide them on their SLSTP journeys, and help foster their love of space life sciences. I know that I will emerge from this summer a better scientist and mentor and I cannot wait to get started!

Project Coordinator
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Desireemoi Bridges

Desireemoi Bridges served previously as the Deputy Director for the NASA Ames Academy for Space Exploration and Space Life Sciences Training Program. Desi has had a hand in coordinating all the operational needs of the 2009-2020 Academies. She gets things done efficiently and with minimal collateral. Desi is available to help you and the staff with any management issues.

Desi joined NASA Ames as a contractor thirteen years ago as an administrative assistant. In addition to working with the NASA Ames Academy, MARTI, SLSTP, I2, and GL4HS Desi also works as the Project Coordinator for the Code S Directorate, front office. Desi looks forward to working with all of you.

Space Biology Project Coordinator

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Kimberly Cadmes

Kimberly is the Space Biology Project Coordinator at NASA Ames Research Center. She provides program and project management support to the Space Biology Project team and academic programs, GeneLab for High School and Space and Life Sciences Training Program. Kimberly joined Ames in 2016 as a contractor, supporting the Office of the Chief Financial Officer as the Central Travel Office Workload Administrator. She delegated and processed Federal travel orders for NASA Ames Science and Aeronautic Directorates, and Armstrong Flight Research Center deployments. In 2018, she went on to support the Ames Partnerships Office assisting the Patent Licensing team with licensing NASA developed technologies. Kimberly received the Group/Team NASA Ames Honor Award as part of the Technology Transfer Office. Her work was also recognized by the FILMSS contract and was presented with a One KBR Award for significantly exceeding established annual performance goals, resulting in widest possible adoption of NASA technologies in the public sector. Kimberly is a detailed oriented individual and is passionate about acquiring new skill sets, improving processes and executing big picture goals. This is Kimberly's first year supporting the Space and Life Sciences Training Program and she is excited for the opportunity to work with everyone!

Science Manager

NASA Ames Research Center

Moffett Field, California

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Elizabeth Keller

Elizabeth Keller receiver her BA and MA Degrees from San Jose State University in Neuro-Cognitive Science. She began her career in space-related work when she was hired as an Ames student research scientist in Aerospace Human Factors. She conducted research on astronauts working in low earth orbit. Later she was hired as a Science Associate in the Space Life Sciences Payloads Office where she worked supporting science payload operations for rodent research on the Space Shuttle. She's been back at Ames Research Center since 2012 as a Senior Scientist in the Space Biology project office, where she has supported budget planning for grants, science outreach, program assessment and analytics reporting, science communications, and as the Project Coordinator for the Space Biology ground grants and student research. Elizabeth is also the creator, author and producer of ExtremeScience.com, an online destination that established a new standard for approachable and engaging science education. Her success with Extreme Science got her noticed by the National Geographic Society, which signed her for a book contract. Elizabeth enjoys engaging the public on NASA's missions and inspiring the next generation.

Space Biology
Deputy Portfolio Manager
NASA Ames Research Center
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Diana Ly

Diana Ly is the Deputy Portfolio Manager of the Space Biology Project at NASA's Ames Research Center in California's Silicon Valley. She is responsible for managing the cost, technical, schedule and risk of a portfolio that consists of over 60 active grants and payload development and operations for space biology experiments on the International Space Station (ISS) and on other free-flyer platforms. She is also the Project Manager for the BIon-M2 project, an international collaboration with the Institute of Biomedical Problems (IBMP) in Moscow, Russia. Before joining NASA as a civil servant in 2017, she spent twelve years as a contractor performing a variety of science roles for the Nanosatellite Program and Shuttle payloads and operations roles for ISS payloads. She started at NASA as an intern on the Space Science Biological Research Project supporting testing of the incubator. Her passion and dedication to teamwork, innovation, and problem solving have earned her numerous awards, including the Space Flight Awareness Silver Snoopy award. In her free time, she enjoys traveling, learning about different cultures and foods, and spending time with family.

Senior Staff Scientist

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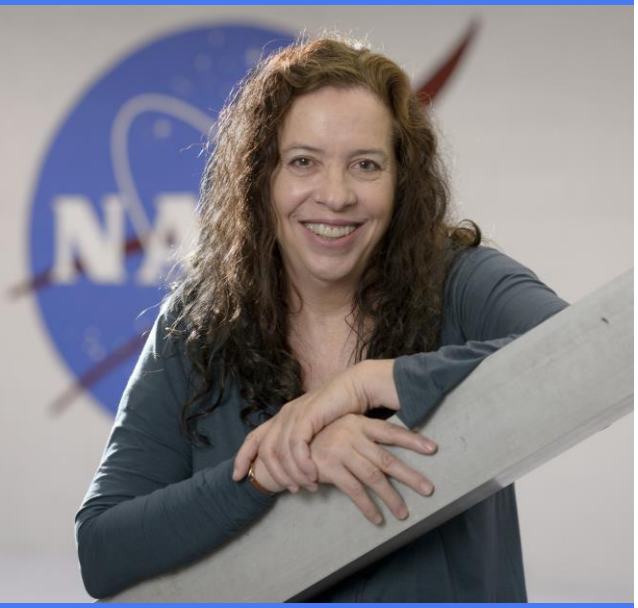
Hami Ray

Hami received her B.S. in Biochemistry from the University of North Texas. While at UNT, Hami was selected as a Scholar into the Ronald E. McNair Post-baccalaureate Achievement Research Program, where she worked on a joint research project between the Biochemistry and Physics Departments. Taking the knowledge she gained while at UNT and in the McNair Program, Hami pursued a Ph.D. from the Pennsylvania State University. Upon receiving her Ph.D. in Pathobiology, Hami began her career as a Project Scientist at the National Aeronautics and Space Administration (NASA) Ames Research Center in Mountain View, California, where she served as the Project Scientist on the SPEGIS spaceflight payload flown on STS-118, among her other roles. Her career path then led her to the Cleveland Clinic Foundation in Cleveland, Ohio, where she initially worked as a Research Coordinator in the Transplant Center/Leukemia and Lymphoma Program, and ultimately as a Research Program Manager for the Center for Clinical Research. After taking a brief break to be a stay-at-home mom to her newborn child, Hami re-entered the NASA Ames family first as an Independent Contractor, then as a Senior Staff Scientist with ASRC Federal Space and Defense. Though she works remotely, Hami is excited to be a part of the SLSTP team and looks forward to continuing her work with the incoming students and staff. She's always just a phone call or email away and happy to assist where she can.

Sigrid Reinsch



Director of Education and Outreach

NASA Ames Research Center
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Dr. Sigrid Reinsch is the Director of Education and Outreach for the NASA Ames Space Biology Project and directs two impactful summer internship programs: GeneLab for High Schools (GL4HS) and the Space Life Sciences Training Program (SLSTP). Dr. Reinsch has expertise in experiments with model organisms for space biology applications, cell, developmental, and molecular biology, and advanced light microscopy. She has been a civil servant at NASA Ames since 1998 and has 40 years of laboratory experience with a wide variety of model systems including plants, viruses, vertebrates (mice/frogs), invertebrates (nematodes, tardigrades) and cultured cells. Reinsch received a Bachelor of Arts degree in Biology from University of California Santa Cruz (UCSC), a Ph.D. in Cell Biology from the University of California San Francisco (UCSF), and performed post-doctoral training at the European Molecular Biology Laboratory (EMBL) in Heidelberg, Germany. Reinsch coordinates NASA Ames Space Biology efforts at multiple scientific conferences and public outreach events each year, organizing and hosting symposia, workshops, and other outreach activities. Reinsch has served as a Senior Scientist on the NASA GeneLab project since 2014 and currently serves as the GeneLab liaison for two international GeneLab Analysis Working Groups (AWG). She also leads the GeneLab Education Working Group (EWG). These groups function to mobilize scientists (AWGs) and teachers (EWGs) to use the data housed in the GeneLab public database for novel peer-reviewed publications, experimental proposals, and course curriculum at both the K-12 and university level. Reinsch is also a founding member of Cov-IRT (the Covid-19 International Research Team) and ISSOP (International Standards for Space Omics Processing) both of which activities resulted from her role in GeneLab. She is a long-standing and active member of the American Society for Cell Biology (ASCB), the American Society for Gravitational and Space Research (ASGSR), the Society for Developmental Biology (SDB) and the American Association for the Advancement of Science (AAAS).

Robert Vik

Space Biology Portfolio Manager

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Robert Vik is currently a Portfolio Manager within the Ames Research Center Biosciences Division. He manages both the Space Biology Portfolio and the International Space Station Biological Payload Development and Sustaining Engineering portfolios for NASA Ames.

Prior to this he was Division Chief for Space Superiority within the Army Space and Missile Defense Command's Technical Center; an assignment he accepted in September of 2019 after completing Senior Service College.

From February of 2013 to July of 2017, Mr. Vik was the Army's program manager for Cryptographic Systems under the Program Executive Office Command, Control, and Computers Tactical (PEO C3T). Mr. Vik started his career with the Army in November of 2009 as the Chief Engineer for the Ground Mobile Radio program.

Before accepting a position with the Army, Mr. Vik spent 20 years working at SPAWAR Systems Center - Pacific (SSC - PAC). In his last position, (2005 – 2008), he was a Branch Chief leading a branch that served as the nexus for a cross departmental rapid response "skunk works" developing capability for the National Intelligence Community. From February 2004 to March 2005 Mr. Vik was the Project Manager for Signals Characterization technology. In this role he was responsible for the development of SIGINT collection systems and processing systems for tactical and space-based sensors. He oversaw development of processing algorithms and dissemination architectures for spacecraft payload data.

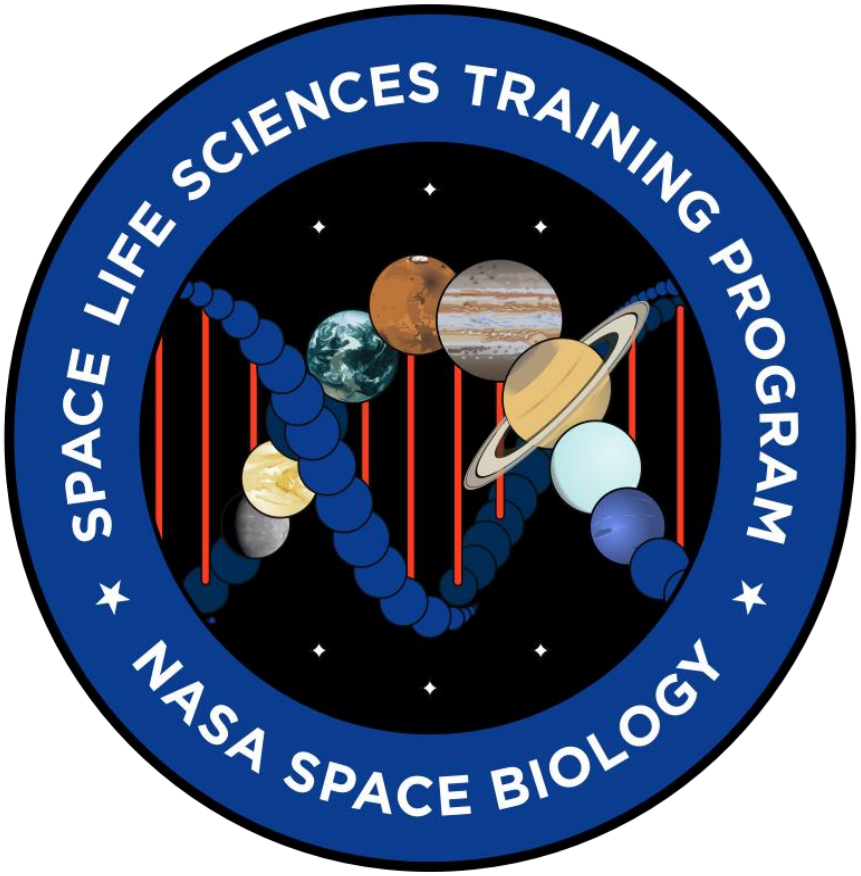
Between 2001 and 2004 Mr. Vik served as a Network Architect and Design Engineer in support of the National Geospatial Intelligence Agency (NGA). In this role he performed Systems Engineering and designed global network architectures for the timely dissemination of intelligence products to forward deployed users.

Mr. Vik spent one year (1999) at the Pentagon working for Deputy Assistant Secretary of the Navy (DASN) for C4I/EW/Space. As the Special Assistant for Communications he provided planning for and oversight of communications and Satellite acquisition programs of record and Advanced Concept Technology Demonstrations (ACTDS) for the Secretary of the Navy.

The early years of Mr. Vik's Government career, (December 1987 to December 1998), were spent working at SSC - PAC as a design engineer and project manager for a variety of projects.

Mr. Vik has a Master of Science Degree in Systems Engineering with an emphasis in Space Systems from the Naval Post Graduate School, a Bachelor of Science Degree in Electrical Engineering from San Diego State University, and a Bachelor of Arts Degree with a double major of International Relations and Economics from the University of California at Davis. He has won numerous awards a few of which include: The Army Superior Civilian Service Award, The Navy Meritorious Civilian Service Award,
and the National Reconnaissance Office (NRO) Team Achievement Award.

2021 Mentors



Jared Broddrick

Research Scientist, Space Biosciences Division
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Dr. Jared Broddrick is a systems biologist supporting the Space Biology Microbiology Discipline and Human Research Program. His research efforts combine omics datasets and mathematical models to derive a mechanistic understanding of microbial physiology in the space environment. Systems biology views life as an interconnected series of networks. The hierarchy of these networks starts at the genome and proceeds through gene-expression and protein networks before arriving at the interaction of life and its environment. Understanding how the spaceflight environment constrains microbial networks is relevant to outstanding questions in the areas of human health in the exploration of space (e.g. microbiome, bacterial pathogenicity, etc.), bioengineering solutions to long-duration spaceflight, and the adaptation of microbial organisms to spacecraft environments. Following the completion of his PhD in biological sciences at the University of California San Diego, Dr. Broddrick was a postdoctoral fellow in the Exobiology Branch at NASA's Ames Research Center. He conducted various fieldwork projects including an investigation into the evolution of photosynthesis on earth which was conducted in Yellowstone. Dr. Broddrick is supportive of educational opportunities at NASA Ames and is excited to be a mentor for this year’s SLSTP!

Egle Cekanaviciute

Research Scientist, Space Biosciences Division
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Egle is a Principal Investigator / Research Scientist in the Radiation Biophysics Laboratory in the Space Biosciences Research Branch at NASA Ames Research Center. She received her B.A. in Neurobiology from Harvard University in 2008 and her Ph.D. in Neuroscience from Stanford University in 2014, followed by postdoctoral research at the University of California, San Francisco on host-microbiome interactions in neuroimmune disease. Egle is an interdisciplinary biologist, combining experimental and computational approaches to investigate the neuroimmune and neurovascular impairments caused by spaceflight and deep space radiation, which is a major astronaut health risk in lunar and Mars exploration. Egle's most recent project is developing high-throughput 3D human organ-on-a-chip models to investigate the effects of simulated deep space radiation on the brain and the blood-brain barrier. In addition, Egle is the Course Director of NASA STAR: Spaceflight Technology, Applications and Research program for training investigators in space biology and in conducting spaceflight experiments, and the NASA Biological and Physical Sciences Division Point of Contact for Science Activation and Citizen Science. In her free time, Egle enjoys running, languages, science outreach and heavy metal, though hopefully not all at once.

Craig Everroad

Research Scientist,
Exobiology Branch
NASA *Ames Research Center*
Moffett Field, California

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Dr. Craig Everroad is a research scientist in the Exobiology Branch at NASA Ames. From a young age he was fascinated with life, and in particular microbiology and marine biology. Originally from Portland, Oregon, he received his BS from the University of Oregon in Political Science and Biology, where he studied international relations and the ecology of marine oligotrophic cyanobacteria. After a short time in the private sector, he returned to the University of Oregon and earned his PhD in Biology, where he explored the adaptive evolution of light-harvesting pigments in bacteria. After his doctorate, Craig spent several years working in Japan at Tokyo Metropolitan University and at RIKEN, where he studied microbial ecology in hot springs and bioreactors, respectively. Craig came to Ames as a NASA postdoctoral program fellow to research hydrogen and biosignature production in intertidal microbial mats. Today, he supports NASA's mission through fundamental Space Biology and Astrobiology research by coupling modern bioinformatics and genomic approaches with classical bacteriology and microbial ecology. He is currently the principal investigator of an ISS microbial experimental evolution project funded by Space Biology and is a collaborator on the ESA ISS Astrobiology experiment 'BioRock.' In his free time, Craig is an avid runner, loves science fiction, enjoys camping and hiking with his family, and is constantly bringing microbiology home as a hobby by fermenting foods (bread, miso, kimchi, sauerkraut, etc.)

Jonathan Galazka

GeneLab Project Scientist
NASA *Ames Research Center*
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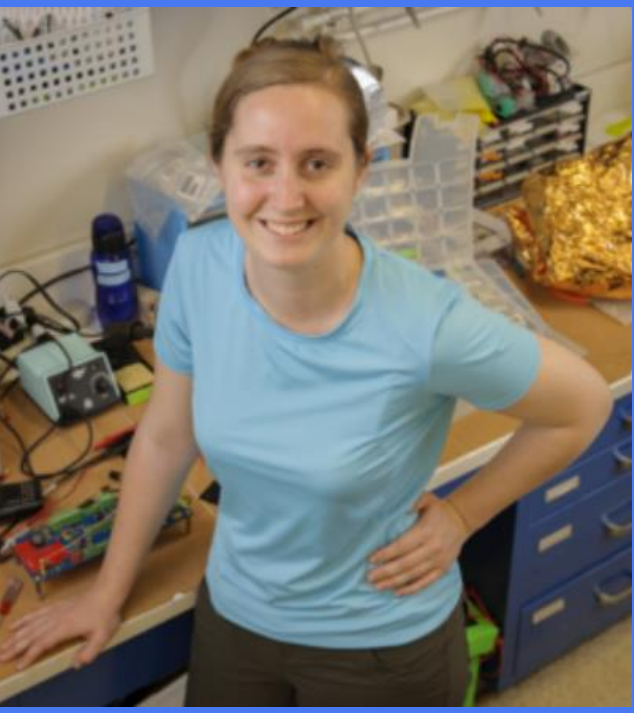
Dr. Jonathan Galazka became the NASA GeneLab Project Scientist in 2017, joining the Space Biosciences Research Branch in 2015. Before this, he was a NASA Postdoctoral Program Fellow at NASA Ames Research Center studying the genetic and epigenetic response of yeast to microgravity exposure and a Postdoctoral Scholar in the lab of Dr. Michael Freitag at Oregon State University, where he studied the mechanisms of heterochromatin establishment and the role of heterochromatin in maintaining genome structure. Jon attained his PhD at the University of California, Berkeley in the lab of Dr. Jamie Cate, studying biomass degradation and conversion by filamentous fungi and yeasts at the Energy Biosciences Institute. In his free time, Jon enjoys spending time with his family in nature.

Diana Gentry



Research Scientist, Space Biosciences Division
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Dr. Diana Gentry hails originally from in Yonkers, New York; she came out to the SF Bay Area for college, studying mechanical engineering at Stanford University, and was introduced to NASA Ames Research Center through an internship with the GeneSat project, a miniature satellite program designed to study microbiology in space. The arrangement proved mutually agreeable, and she stayed to receive a Ph.D. while working as part of the Ames Graduate Cooperative Program, demonstrating a manufacturing method for structural biomaterials using 3D-printed arrays of genetically engineered cells. She has been a full-time researcher at NASA since 2015 and is now the head of the Bioengineering & Instrumentation Group (BeING) Lab and the co-director of Ames's recently established Aerobiology Laboratory. Her current projects at NASA Ames focus on 'top down' approaches to studying complex, emergent biological systems, including developing an optical/biofluidics system to detect small changes in microbial cultures aboard the BioSentinel small satellite mission, machine-learning-directed experimental evolution of microbial cultures, modeling the distribution and variation of Mars analogue biosignatures, and studying the spatial and temporal distributions of microbes in cloud and fog water as a potential analogue for Venus. Dr. Gentry describes herself as a “professional wearer of many hats”, bridging science and engineering to discover new ways of addressing questions in astrobiology, space biology, and bioengineering. She has hosted interns from a number of NASA student programs, as well as co-advising master’s and Ph.D. students at nearby universities, and is excited to host this summer’s SLSTP cohort.

John Hogan

Research Scientist, Space Biosciences Division
NASA *Ames Research Center*
Moffett Field, California

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Dr. John Hogan is the Bioengineering Branch Chief at NASA Ames Research Center, Moffett Field, CA. His research supports NASA's Life Support and Habitation Systems, and Synthetic Biology Applications programs which involves the development of sustainable systems for extended extraterrestrial human habitation. Major areas of research and technology development have included integrated biological and physico-chemical technologies for regenerative air, water and solid waste treatment systems, bio-manufacturing, systems analysis and integration, planetary protection, and data systems development. His interests also include investigating how NASA's regenerative closed-loop life support and systems engineering principles maybe applied to large-scale terrestrial operations. Prior to joining NASA, Dr. Hogan was research faculty at Rutgers, The State University of New Jersey in the Department of Environmental Sciences. At Rutgers, he participated in a NASA funded, multidisciplinary program developing biologically based, sustainable systems for long-term planetary bases. Dr. Hogan received his B.S., M.S. and Ph.D. in the Department of Environmental Sciences at Rutgers, The State University of New Jersey, New Brunswick, NJ.

Jessica Lee

Research Scientist, Space Biosciences Division

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Dr. Jessica Lee's work focuses on what microbes really experience when they come to space with us. How do they feel space stresses like microgravity and radiation, and how is that different from what multicellular organisms experience? What is the fate of the microbes that hitchhike on space hardware? How can we use our knowledge of microbial ecology to ensure healthy built environments for human explorers? At NASA she is a project scientist supporting biological research beyond Low Earth Orbit, contributes to an effort to catalogue and archive all of NASA's microbial isolates, and always maintains at least one side project involving the computational modeling of microbial population dynamics. In her independent research, Dr. Lee hopes to develop experimental and computational methods to study microbial behavior (phenotype) at the single-cell level in space environments. Microbiologists often make bulk measurements of populations comprising millions or billions of cells, but we have much to learn from examining the distribution of phenotypes among individual cells (phenotypic diversity). Studying microbes as single cells in the space context can not only help us to answer unanswered questions in space microbiology, but also to better understand the evolution of phenotypic diversity on Earth. Dr. Lee has an impressive educational background. After completing her BS in biology from MIT, Dr. Lee went on to receive two M.Sc. degrees from Oxford University; one in biodiversity and one in biology. Eventually, she went on to complete her PhD in earth system science from Stanford University. Dr. Lee completed her postdoctoral fellowships at University of Idaho and San Francisco State University. She has been working at Ames since 2020.

Sergio Santa Maria

Research Scientist, Space Biosciences Division

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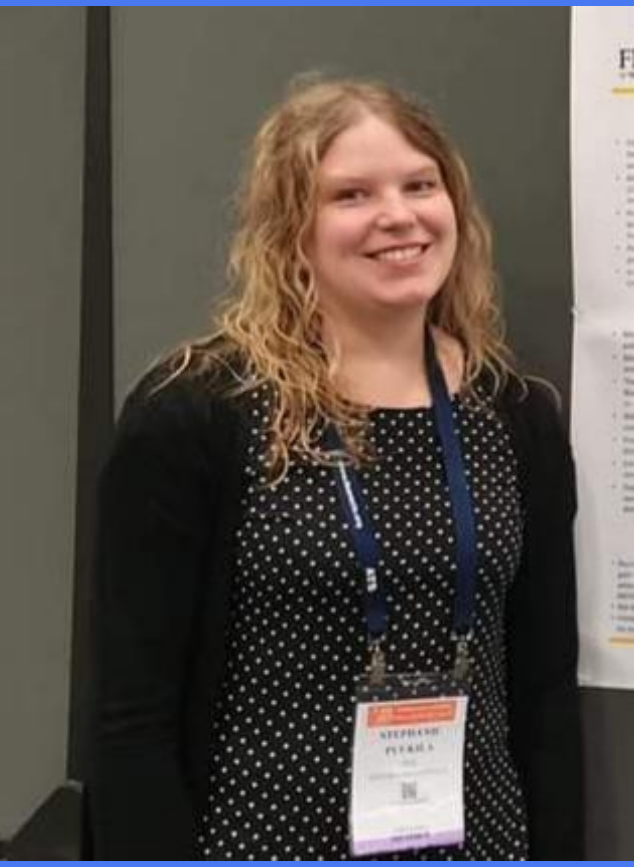
Dr. Sergio Santa Maria is a Research Scientist in the Space Bioscience Division at NASA Ames Research Center in Moffett Field, CA. Dr. Santa Maria serves as research faculty for COSMIAC at the University of New Mexico. His research interests are in the areas of DNA damage repair, space radiation, and biosensor technologies. He is currently the Lead Project Scientist for NASA's BioSentinel mission, a 6U nanosatellite that will fly as a secondary payload on NASA's ARTEMIS-1, scheduled for launch in 2021/2022. He is responsible for the development of the space radiation biosensors that will be used in BioSentinel and for testing and validation of the biosensors using different ionizing radiation sources, including particle accelerator experiments at the NASA Space Radiation Laboratory at Brookhaven National Laboratory and the proton accelerator facility at Loma Linda University. Additional projects involve the development of new biosensor technologies using dielectric spectroscopy and adaptive evolution studies under simulated microgravity. He earned his Ph.D. in Biochemistry and Molecular Biology from The University of Texas Medical Branch in 2008 and continued his postdoctoral studies at New York University School of Medicine as an American Cancer Society Postdoctoral Fellow from 2009 to 2013. He started working at NASA Ames Research Center in 2014.

Stephanie Puukila



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Born and raised in Canada, Dr. Stephanie Puukila just began her journey with NASA when she accepted her postdoctoral fellowship at NASA Ames Research Center in 2021. For the past year, she has been working remotely in the lab of Dr. April Ronca, a principal investigator at Ames, but she is about to begin in-person research with her big move to the United States this summer. Dr. Puukila has a strong background in biology. She received her B.S. in applied molecular biology, her M.Sc. in biology, and her PhD in biotechnology in medicine all from Lakehead University in Ontario, Canada. Stephanie's PhD thesis was titled, "Cardiac oxidative stress and antioxidant status in response to radiation and monocrotaline induced cardiac dysfunction". Currently, she is working on various behavioral neuroscience, physiology, and immune-physiology projects at NASA Ames. She is interested in how space affects cognitive behavior as well as physiological adaptations that result from spaceflight and microgravity. In her work, Dr. Puukila uses transgenic mice, called mCAT mice, that overexpress the human catalase gene in the mitochondria. Research using mCAT mice aims to determine the role of redox defenses in physiological changes due to spaceflight. Dr. Puukila is excited for what the next few years have in store for her at Ames!