National Aeronautics and Space Administration

Women of Goddard

Careers in

Science

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Women of Goddard: Careers in Science, Technology, Engineering and Mathematics

Parkinson, Millar, Thaller

Women of Goddard: Careers in Science, Technology, Engineering, and Mathematics

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In Association with:

The Maryland Women's Heritage Center (MWHC)

NASA Goddard Space Flight Center, Greenbelt, Maryland, July 2011

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Foreword

A century ago women in the United States could be schoolteachers and nurses but were largely excluded from the vast majority of other jobs that could be classified as Science, Technology, Engineering, or Mathematics (STEM careers). Some inroads were fortuitously made during World Wars I and II, when because of the number of men engaged in fighting overseas it became essential that women fill in on jobs of all types on the home front. However, many of these inroads were lost after the wars ended and the men returned. As a result, in the 1950s and 1960s, most women were still excluded from STEM careers other than teaching and nursing. The situation improved markedly after passage in 1972 of Title IX, declaring that: "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance."

But laws alone cannot eliminate prejudicial attitudes or fully correct long-standing injustices. Although legally there were no restrictions on the STEM careers women might enter, there remained many practical limitations, including girls growing up with a severe lack of women role models in STEM careers and often being told either explicitly or implicitly that science, engineering, and mathematics are subjects and careers for boys and not girls.

The women featured in this book are, for the most part, well aware that the jobs they have would not have been readily open to the women of previous generations. Many of these women are old enough to have had to overcome severe prejudices while growing up and early in their careers, and many helped to pioneer the way as the first female accomplishing one task or another. It is true that some of the women in this book still continue to find themselves the only female in the room as important decisions are being made, but this has become less and less frequent, to the benefit of all.

Partly because of the history of women in STEM careers, almost all the women in this book - whether they personally had to endure prejudice or not – are tremendously appreciative of the jobs they have. They have worked hard to perform well, and this has been reflected in the many recognitions and awards they have received. Not only have most received Goddard and NASA awards, but quite a few have also been honored with major awards from outside of NASA. As examples: some have received honorary doctorates; some have Lifetime Achievement Awards; two (one now deceased) have been elected to the U.S. National Academy of Engineering; and several have been elected Fellows of major national or international societies, including the American Association for the Advancement of Science (AAAS), the American Astronautical Society, the American Geophysical Union, and the American Meteorological Society. Many have the satisfaction of having published articles about their research in professional journals, and some have also published books. Most have college degrees, and quite a few, especially in the science category, have Ph.D. degrees.

Not only are the women in this book thriving in STEM careers, but we are doing so at a very unique and very special place - NASA's Goddard Space Flight Center (abbreviated NASA GSFC, or, more informally, NASA Goddard). Here we are part of the grand enterprise that is the American space program. As such, we are part of the agency that landed humans on the Moon, that sent robotic rovers to wander around on Mars, that has opened whole new vistas on the universe through such missions as the Cosmic Background Explorer (COBE) and the Hubble Space Telescope, and that has vastly increased the understanding of our home planet Earth through space-based observations from such satellite platforms as the Nimbus series, Landsat, and the satellites of the Earth Observing System. We have taken major roles in many of those accomplishments and are heavily involved in the planning for new missions that will further expand the exploration and understanding of the Earth and the universe. As part of the NASA family, we have shared in the amazing accomplishments of this amazing agency and have mourned together the great tragedies that have come on occasion during the efforts to accomplish incredibly difficult and sometimes extremely dangerous tasks.

Although this book features women from only one institution, it reflects the large variety of STEM careers now open to both women and men. It illustrates that people with solid STEM backgrounds can become not only scientists and engineers of many types, technologists, and mathematicians, but also architects, computer programmers and visualizers, patent attorneys, astronauts, managers, and other exciting possibilities. We hope especially that girls and boys reading this book will get excited by the variety of careers that will be open to them if they ground themselves with the appropriate educational background in STEM subject matter.

Fortunately, girls now are not growing up with many of the disadvantages of the past. In fact, boys are now just as likely to grow up with disadvantages of one type or another. Although this book only features women, it is important to recognize that the STEM careers illustrated are open to all – women and men, young and old and in between, any race, any ethnicity, and physically disabled or not. We hope that boys and girls will be equally inspired by the numerous and varied careers highlighted herein.

The idea for this book came about during a meeting in January 2011, when a group of Goddard women scientists and engineers met with Linda Shevitz and Mary Cleave of the Maryland Women's Heritage Center (MWHC) to brainstorm about ways in which Goddard women could participate in an exhibit under development at the MWHC celebrating Maryland women in STEM careers. As a former NASA and Goddard employee – featured later in this book – Mary was the key link, initiating the contact between the MWHC and Goddard. After the decision was made to produce the book, all Goddard women in STEM-related careers were encouraged to participate by providing one photograph, text regarding their careers, and a quote, for a one-page highlight. We were extremely pleased that 101 Goddard women responded (we additionally wrote entries for two prominent but deceased Goddard women) and that those responses came from an exciting diversity of individuals. Ages represented range from teenagers through senior citizens; career states range from interns through retired long-time career employees; and many ethnicities and backgrounds are represented, along with a wide variety of career choices. After editing to increase the consistency of the style and contents, these entries are compiled here in alphabetical order. Color coding has been used to distinguish careers in science (blue), technology (green), engineering (gold), and mathematics (red), with the realization that in some cases more than one category could have been selected. For instance, computer scientists engage in activities related to each of the STEM categories, but we chose to place computer scientists under 'mathematics', as generally the most appropriate of the four choices.

Goddard management has been wonderfully supportive of this booklet, and we particularly thank Center Director Robert Strain, Sciences and Exploration Directorate Director Nicholas White, the Earth Observing System Senior Project Scientist Steve Platnick, the Women's Advisory Committee, and the Diversity Council. We also very much thank Jay Friedlander, who did the final layout for the book and worked closely with us throughout the publication process, and Diana Khachadourian, for help with copyediting.

This has been an inspiring project to work on, as through this activity we have each learned more about the varied and exciting careers of the women at Goddard. We hope that the readers will also be inspired and that those thinking about future career choices will have their minds opened by the careers illustrated here.

Claire L. Parkinson, Pamela S. Millar, and Michelle Thaller

NASA Goddard Space Flight Center
Greenbelt, Maryland
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GEORGETTE ALEXANDER-MORRISON

Business Development Director
(Contractor with Orbital Sciences Corporation)

Georgette beside a poster for a winning Orbital proposal, March 2011. She had directed the successful proposal production.

Georgette Alexander-Morrison began her aerospace career as a materials engineer working production process evaluations, improvements, and failure analyses (electronics, adhesives, and coatings). Georgette's career transitioned into project management, where she managed flight and non-flight hardware development, production, and test activities. Her assignments included a high gain antenna system, electronics assemblies, solar array substrates, cable assemblies (harnesses), and a Small Explorer spacecraft structure fabrication. In one assignment, Georgette spent two years on-site at NASA Goddard providing support for two NASA Polar Operational Environmental Satellite instruments: the High resolution Infrared Radiation Sounder (HIRS) and the Advanced Very High Resolution Radiometer (AVHRR). Georgette served as Orbital's Engineering Directorate Instrument Support Service contract Program Manager for two years; after that, she transitioned into Business Development. Georgette is currently a Director of Business Development, managing the Orbital Technical Service Division's in-house proposals and working on new business capture management.

Georgette is an active member of the St. George Greek Orthodox Church in Bethesda, Maryland; she teaches second grade Sunday school and works many hours at the annual Greek Festival. For the past four years, Georgette has volunteered with the Chesapeake Youth Symphony Orchestra in Annapolis, Maryland, as a co-manager of the Concert Orchestra and the Symphony Orchestra. She loves to read mysteries and enjoys books by Clancy, Koontz, Deaver, Cornwell, Patterson, Reichs, Robb (Roberts), and Grafton. She is a 'novice' foodie and loves to cook Greek and Mediterranean foods. However, after reading and watching *Julie and Julia*, Georgette has a new challenge—to cook "some" of the recipes in Julia Child's *Mastering the Art of French Cooking* cookbook—the beef bourguignon is wonderful!

"Make a decision. Get the work done. Live with the consequences and results of your decision."

ADRIANA APOLITO-BEVIS

Program Manager
(Contractor with Orbital Sciences Corporation)

Adriana beside the proposal cover of a winning Orbital contract with NASA Goddard, March 2011. She was a vital member of the winning proposal team.

Adriana Apolito-Bevis began her Aerospace career in 1991 as a systems engineer developing and integrating secondary payloads onto the Space Shuttle. She worked on the Get Away Special (GAS) and Hitchhiker (HH) programs at Goddard that were developed to utilize any remaining space on Shuttle missions not used by the primary payloads. In 1997, she transitioned into a new role as a Mission Manager for the Pegasus and Taurus programs—small expendable launch vehicles developed by Orbital. As a mission manager, she helped launched many payloads for NASA including Terriers, the Solar Radiation and Climate Experiment (SORCE), the Galaxy Evolution Explorer (GALEX), and the Aeronomy of Ice in the Mesosphere (AIM) satellite mission. Next, her career took her into the commercial arena, where she led the Spacecraft Integration department at International Launch Services (ILS). While at ILS, she launched many commercial payloads for satellite providers around the world on the Russian Proton launch vehicle. After several years of travelling to exciting places such as Toulouse, Tunisia, Paris, Moscow, and the Baikonur Cosmodrome in Kazakhstan, her career brought her back to Orbital Sciences Corporation. Adriana is working in the Technical Services Division as a Program Manager for Goddard's Software Engineering Services and Space Communications and Network Services contracts. She also works on new business capture management.

Adriana currently volunteers as a member of the City Dock Advisory Committee for the City of Annapolis. This committee is chartered with spearheading the City's planning effort to redevelop City Dock and will present a City Dock plan to Mayor Josh Cohen and the City Council. The City Dock plan will establish the guiding principles for City Dock and set the stage for design planning.

"Always strive to make improvements in everything you do. There are always opportunities to grow in knowledge and ability. It is important to take advantage of every chance to learn more about ourselves and the changing world. Always remain open to new ideas and directions."

LISA BARTUSEK

Systems Engineer
(NASA GSFC civil servant)

Photo by Warren Shultzaberger

Lisa outside the cleanroom at Goddard in which the GPM spacecraft is being integrated, April 2011.

Lisa Bartusek started her career at Goddard fresh out of school with a bachelor's degree in Electrical Engineering. She has had the privilege of being part of the development team for several in-house scientific Observatory developments, with missions ranging from investigating the beginning of the Universe to studying the Sun. Lisa currently works as a Systems Engineer for the Global Precipitation Measurement (GPM) Observatory, which is a partnership between NASA and the Japanese Aerospace Exploration Agency (JAXA). The GPM mission will advance the understanding of the Earth's water and energy cycles and will extend current capabilities in using accurate and timely information on precipitation to directly benefit society. Lisa works at the System-level to ensure the technical integration and verification of the various pieces of the Observatory, including spacecraft electronics built in-house at Goddard and precipitation radars built in Japan.

"The most important skill to have for this job is the ability to listen to all the opinions and sort out the best technical solution given the schedule, cost, and risk constraints. It's a challenge every day ... and I love it!"

KATHERINE BENDER

Education Specialist
(Contractor with ARES Corporation)

Katherine perched at Artist's Palette, Death Valley, California, site of a remote webcast, December 2000.

Connecting NASA science and engineering content directly to the classroom has taken Katherine Bender all the way from the lowest spot in the Western Hemisphere to one of the most active volcanoes on Earth, and from inside a cleanroom where the Aqua and Aura satellites were being built to above the clouds on top of Mauna Kea; and her students and classrooms across the country have gone with her both physically and virtually. Having started her career with a science background plus 19 years teaching science at the secondary level, Katherine's work at Goddard began with developing a curriculum for a remote sensing program and producing educational webcasts spotlighting the Aqua and Aura Earth-observing missions. Now she serves as an Education Specialist in the Goddard Education Office, where her passion for engaging teachers and students with sound science content and her experience with scientific processes and technology integration are exercised through her project management of the History of Winter professional development program and her coordination of the Goddard High School Internship programs.

"I have always loved science, especially the never-ending nature of study. Something that I've shared with my students and, in fact, with my own children, is a quote that I first heard from a coach: 'When you're through learning, you're through.' It has become the foundation of my education philosophy and keeps me focused on knowing what I can and do know, and even better, what I don't know. I enjoy it too much to ever want to quit!"

SUSAN BREON

Cryogenics Engineer
(NASA GSFC civil servant)

Photo by Jay Friedlander

Susan next to the Astro H test dewar at NASA Goddard, April 2011.

As Head of the Cryogenics and Fluids Branch at NASA Goddard, Susan Breon manages 25 physicists, engineers, and technicians to build cold—really cold—systems to cool detectors and optical systems to temperatures near absolute zero. The cryogenic systems that her branch builds operate from a high temperature of about 100 Kelvin (-280°F) to as low as 50 milliKelvin (-459.6°F). At these temperatures, the detectors on satellites can see the faintest of signals from the earliest galaxies and can pick up individual X-rays from around black holes and colliding galaxies. For satellites looking towards Earth, cryogenic detectors are used to track hot spots like volcanoes and forest fires, as well as cool spots like underground water and vegetation. As part of her work, Susan has travelled to many places around the globe, including exciting locales such as Japan, Switzerland, and Alaska. She is very proud of the work she did in developing the Helium Insert for the X-ray Spectrometer, an instrument aboard the Japanese Astro-E satellite. The system included a liquid helium system at 1.3 Kelvin and a special type of refrigerator known as an adiabatic demagnetization refrigerator operating at 60 milliKelvin.

"It is a privilege to work on such exciting missions and with such great teams as we have at NASA."

PAM BRINCKERHOFF

Thermal Engineer
(Contractor with
Edge Space Systems)

Pam in front of the Thermal InfraRed Sensor (TIRS) radiators, February 2011.

Pam Brinckerhoff became interested in space systems engineering after taking an astronomy class in high school. The class assigned each student a picture taken from the Hubble Space Telescope to examine; and Pam was amazed by the images and impressed that spacecraft were needed to see such cool things in space. The idea of working on spacecraft as her career was very exciting, so she pursued aerospace engineering in college. Pam became a thermal engineer after an internship introduced her to the field, where she found that she really enjoyed working on the thermal design of spacecraft because of the challenge to keep different parts of the spacecraft at the right temperatures in the extreme space environment.

Pam has worked as a thermal engineer at Goddard since 2010. As an early career engineer, she has had the opportunity to work on a cryogenic instrument called TIRS, which stands for Thermal InfraRed Sensor and will collect thermal images of the Earth. While working on TIRS, Pam designed, analyzed, and conducted several tests on the radiators to ensure that they functioned as expected, and she is currently working on the design of the thermal blankets for the instrument. Pam divides her time at work between preparing for her next integration task and working in a cleanroom on the flight hardware.

"I really feel like the work I'm doing is important. The data produced by TIRS will help better manage the water budget across the country, which can help us reduce our carbon footprint. It's really cool to think that I'm working on something that is going to have an impact like that."

BETH BROWN

Astrophysicist
(NASA GSFC civil servant, deceased)

Photo by Jay Friedlander

Beth doing outreach at the Goddard visitor center.

Beth Brown was always fascinated by space. She grew up watching Star Trek and Star Wars, wanting to become an astronaut. However, that initial goal was hindered by nearsightedness, and so she turned her interest to the study of the stars, and after receiving her Ph.D. came to NASA Goddard as a National Academy of Science/National Research Council (NAS/NRC) Post-Doctoral Research Associate. In 2001, she was appointed as an Astrophysicist Fellow in the NASA Administrator's fellowship Program (NAFP) and was named a Visiting Assistant Professor at Howard University. Her most recent position was Assistant Director for Science Communications and Higher Education in the Science and Exploration Directorate at NASA Goddard before her tragic death at age 39 on October 5, 2008.

Beth Brown was a rising star in the field of astrophysics. She lit up a room with her smile and made everyone in her presence feel that they were important. After her death, the Women in Astronomy and Space Science Conference 2009 was dedicated to her memory and to her contributions not just in the field of astronomy but also in inspiring women and minorities to pursue careers in astrophysics.

"It is a privilege to work on such exciting missions and with such great teams as we have at NASA."

KRIS BROWN

Systems Engineer and Strategist
(NASA GSFC civil servant)

Photo by Bill Hrybyk

Kris in her official NASA photo, November 2010.

In her 22 years at NASA, Kris Brown has contributed to a wide and diverse range of endeavors, all leading to an exciting and fulfilling career. Early on, Kris learned firsthand through hands-on work and was accountable for the assembly and testing of instruments and spacecraft. As the Mechanical Systems Manager on the Global Geospace Science Wind and Polar and the Tracking and Data Relay Satellite (TDRS) missions, she worked in close collaboration with other discipline and systems engineers. On Wind and Polar, Kris worked with 22 science teams simultaneously to accommodate instruments that later performed valuable measurements of the magnetosphere. TDRS provided a unique opportunity to manage multiple spacecraft at various phases of development — spacecraft assembly, test, and launch preparation and operations for TDRS-F and TDRS-G on STS-54 and STS-70. She also led the creation of the Integrated Mission Design Center (IMDC), literally transforming how Goddard approached the early design of missions and instruments, and used her skills in strategy and planning in helping to develop NASA's response to the Columbia Accident Investigation Board report and in leading the development of Goddard's Strategic Plan in 2008. In 2010, Kris followed her passion in engaging and educating students and the public, taking on the exciting assignment of Deputy Chief of Goddard's Office of Communications.

"NASA has provided me with tremendous opportunities – and multiple paths to explore and contribute. In my current position, I am able to translate my experiences as an engineer and communicate Goddard's amazing work in a real and exciting way. I have aligned my passion for engaging and educating students and the public in science, engineering, and technology with what I do every day, making tangible contributions to our nation's science literacy."

MOLLY E. BROWN

Geographer
(NASA GSFC civil servant)

Molly live on network television discussing the launch of NOAA-N Prime, from the NASA Goddard television studio, February 2009.

Molly Brown uses satellite data to study agriculture and food security in developing countries, as well as in a broad array of applications of remote sensing data, such as monitoring floods in Nepal and urban tree growth in the Eastern United States. She is involved in a range of projects that focus on expanding the use and utility of satellite remote sensing observations and Earth science models in a variety of decision making contexts.

Molly has worked on integrating satellite remote sensing information into econometric models that promise to predict variations in local food prices during extremely wet and dry events in West Africa. She also works with the U.S. Agency for International Development's Famine Early Warning Systems Network (FEWS NET). In this role she provides information and expertise on satellite-derived global vegetation data (particularly from NOAA Advanced Very High Resolution Radiometer instruments, hence her work with NOAA-N Prime) and on using data from multiple sensors in work identifying and documenting food security crises. Her work with FEWS NET has been the basis of a broader investigation of how Earth science data are used for decision making in a variety of settings, including those of (1) deciding how melting glaciers will affect millions of people in Asia who are dependent on river water and (2) understanding the effect of weather on food production globally. She is currently working with NASA's Soil Moisture Active Passive (SMAP) mission and is on the Science Definition Team of NASA's Carbon Monitoring System (CMS).

"As a NASA civil servant, I have the opportunity to be involved in developing and launching satellites that will provide data in the coming decades that can answer key questions regarding how the environment is changing. I never dreamed that I would have such great opportunities so early in my career – leading large groups of extremely smart people is both fun and challenging!"

DARLENE BRUMMELL

Architect
(NASA GSFC civil servant)

Darlene across the street from the Goddard Child Development Center, April 2011.

Darlene Brummell is an Architect, Project Manager, and Building Outfitting Team Lead in the Facilities Management Division at Goddard. Darlene has been employed with NASA for over 25 years and began her architectural career as a co-op student at Goddard's Wallops Flight Facility in Wallops Island, Virginia.

As Outfitting Deputy Project Manager for the new Exploration Sciences Building (ESB), Darlene led and advised in the planning, organizing, and directing of the largest building outfitting effort at Goddard. The ESB is a state-of-the-art facility designed to U.S. Green Building Council Leadership Energy and Environmental Design (USGBC LEED) Gold rated standard. The facility is 200,000 square feet and houses various space-usage types, such as offices for center level directorate, divisions, and branch management, scientist and engineers, and multiple laboratory facilities. The ESB houses a total of 39 labs and five cleanrooms, including a Microcalorimeter Cleanroom, Ultraviolet Detector Lab, Flight Electronics Lab, four Science Mission Operations Rooms, Mission Operations and Archives Room for the Composite Infrared Spectrometer on the Cassini mission, the Lunar Exploration Neutron Detector Science Operations Center Room, and a Mechanical Design and Prototype Room. The ESB also provides space for our in-house external partners such as the Emeriti Room and Post Doctoral Rooms, as well as a contemporary open space area for the interns and summer students.

"My desire to work for NASA started with my passion for the TV series Star Trek. *It's so cool to be involved with the science and technology that defines our lives now as well as in the future, so 'Live long and prosper'."*

LISA CALLAHAN

Aerospace Engineer
(NASA GSFC civil servant)

Photo by Ryan Cargo

Lisa helping to prepare the Multiple Altimeter Beam Experimental Lidar (MABEL) for integration onto the ER-2 airplane at Dryden, December 2010. MABEL is a prototype or proof-of-concept instrument for an instrument to be flown in space on the Ice, Clouds, and Land Elevation Satellite 2 (ICESat 2).

While working at NASA for almost 23 years, Lisa Callahan has designed, analyzed, and tested propulsion systems, negotiated international agreements for the Space Station, and managed Goddard's technology development program. Starting at Goddard as a propulsion engineer, Lisa went on to get a Master's degree in Science, Technology, and Public Policy that led to working at NASA Headquarters for 6 years before returning to Goddard. Lisa currently serves as the Associate Director for Mission Planning and Technology Development in the Earth Sciences Division, a position that brings together scientists, instrument and systems engineers, and mission planners to develop new measurement concepts.

"I've always liked the idea that while much about our world has been discovered, is understood, and has been put into books, there is still much more to learn; and NASA is one of the best places I can think of to do that. The people who work at NASA are truly inspiring, and what we do on any given day in pursuit of knowledge and understanding is beyond cool. I love being a part of the process of discovery."

ANN HORNSCHEMEIER CARDIFF

Astrophysicist
(NASA GSFC civil servant)

Ann outside at Goddard, April 2011.

In 2011 Ann Hornschemeier Cardiff is using astronomical datasets from a suite of NASA observatories to understand neutron star and black hole binary systems. Ann leads a group of scientists working on studying these binary systems in external galaxies and uses satellites such as Chandra, Spitzer, the Galaxy Evolution Explorer (GALEX), and Swift in conjunction with ground-based telescopes. She is currently collaborating with a theory group based at Northwestern University in Illinois on a project that will use at least two million hours of NASA and Northwestern supercomputer time to model millions upon millions of binary stars. This theoretical work combined with Ann's observational team's work will help us understand how neutron stars and black holes are formed, hopefully giving us a better understanding of precursors to gravity waves and/or gamma ray bursts.

Ann spends a lot of her time working on future mission concepts for NASA and serving the wider community via standing advisory committees. She is very excited about the launch of NASA explorer NuSTAR in 2012, which has a woman as Principal Investigator (Fiona Harrison of Caltech). Ann is involved in the science team for this hard X-ray mission and will be studying two nearby starburst galaxies in detail.

"Right now I'm just amazed at the wealth of brainpower around me. We have experts on tap in a broad range of areas, and it is incredibly intellectually stimulating. As a postdoc, I often really preferred to work at home, and now I really prefer to be here as much as I can."

CANDACE CARLISLE

Engineering Project Manager
(NASA GSFC civil servant)

Photo by Warren Shultzaberger

Candace with the GPM Spacecraft Qualification Structure at Goddard, April 2011.

Candace Carlisle is the Deputy Project Manager for the Global Precipitation Measurement (GPM) mission. The GPM project office is responsible for the Core Observatory spacecraft, the microwave radiometer instrument, the testing of the entire observatory (spacecraft and instruments), and the control center for on-orbit operations. The Core Observatory is being built and tested at Goddard.

The Japan Aerospace Exploration Agency (JAXA) is NASA's partner in the GPM effort, contributing the dual-frequency precipitation radar and the launch vehicle. As Deputy Project Manager, Candace is involved in management of all technical and programmatic aspects of the project.

Candace's prior experience includes system engineering for the Space Technology 5 (ST5) and Earth Science Data and Information System (ESDIS) projects. She started her career at Goddard in software development.

"The thing I like best about being a System Engineer or Project Manager is that you see the big picture and are involved in a lot of different things. These are good careers for synthesists, people who like to see things come together into a whole that is greater than the sum of the parts. We are in the most exciting part of the GPM project right now, when all of the different components are being put together to build the Core Observatory."

NANCY CAROSSO

Physicist and Aerospace Contamination Engineer
(NASA GSFC civil servant)

Nancy with returned Long Duration Exposure Facility (LDEF) hardware showing space environments materials damage, January 2011.

With an academic background in physics, Nancy Carosso joined NASA in 1983 and has by now worked for decades to help predict space environments of NASA's missions. She serves as the Chief Engineer for Goddard's Contamination and Coatings Branch, with the aim of ensuring that spacecraft will perform as designed and send back the perfect *un-smudged* images of our solar system and distant stars for which NASA is known. Today's instruments have sophisticated optics and detectors that can only withstand small amounts of molecular and particulate accumulations on their surfaces. Nancy has supported many NASA projects, including the proposed missions to asteroids and Jupiter's moons.

Not only are Nancy and her group concerned about the traditional space contaminants, but after evaluating returned flight hardware and flying experiments on the Space Shuttle and spacecraft missions, Nancy has been working on solar ultraviolet effects, charged particle effects, and atomic oxygen degradation of materials. In addition, she is developing Planetary Protection capabilities, which include ensuring that biological contaminants are not sent to other planets and are not returned to Earth from other planets.

"Working at NASA has truly been a gift. When you can say that you've never had a boring day at work – after nearly 30 years – you are truly a lucky soul. Every mission, every day offers a new opportunity and a chance to learn. And then, through the mentoring programs, you have a chance to give back."

LYNN CARTER

Planetary Scientist
(NASA GSFC civil servant)

Photo by Patrick Russell

Lynn participating in a fieldwork campaign at Sunset Crater Monument in Arizona, October 2010.

Lynn Carter is a scientist who studies how the surfaces of different planets were formed. She is particularly interested in how volcanoes and impact craters have shaped the surfaces of Venus, Mars, and the Moon. As a planetary scientist, Lynn uses techniques from both astronomy and geology for her research. Her research often involves using radar data, because radar waves are very long and can travel into the surface and reveal buried structures.

In the picture, Lynn is using a ground penetrating radar to look for buried interfaces between different volcanic layers at Sunset Crater Monument near Flagstaff, Arizona. Mapping the structure and extent of these buried lava flows will help us determine the volume, extent, and type of eruptions from Sunset Crater. A similar system could someday be used on a rover, or possibly by astronauts, to study volcanic terrains on other planets. With colleagues, Lynn is using the Arecibo Observatory radar system to make a radar map of the nearside of the Moon; and she also works with radar instruments on the Lunar Reconnaissance Orbiter and Mars Reconnaissance Orbiter.

"One of my favorite things about my job is being among the first people to see something new and interesting on another planet. It's very exciting to be involved in a new scientific discovery."

SANDRA CAUFFMAN

Engineer
(NASA GSFC civil servant)

Photo by Bill Hrybyk

Sandra during a GEMS meeting with NASA Headquarters, April 2009.

In June 2008, Sandra Cauffman was asked to serve as the Project Manager for the Gravity and Extreme Magnetism Small Explorer (GEMS) Phase A study, competing with six other proposed Small Explorer missions. In June 2009, GEMS was one of two missions selected for implementation. GEMS is currently in Phase B, and Mission Confirmation will be in late summer 2011. GEMS is an Astrophysics mission that will use X-Ray polarimetry to explore the shape of space that has been distorted by a spinning black hole's gravity, and it will also probe the structure and effects of the formidable magnetic field around magnetars, which are dead stars with magnetic fields trillions of times stronger than Earth's.

In her 20-plus years at Goddard, Sandra has served in many roles. Early in her career at Goddard she was a contractor working as a Command and Data Handling subsystem engineer and optical designer. She became a civil servant at Goddard in 1991, as a Ground Systems Manager supporting missions such as the Hubble Space Telescope (HST) First Servicing Mission, the Upper Atmosphere Research Satellite (UARS), and the Explorers Platform/Extreme Ultraviolet Explorer. She served the longest in the Geostationary Operational Environmental Satellite (GOES) Project, taking on a variety of roles from Instrument Manager to Deputy Project Manager. She also served as the Assistant Director for Flight Projects before becoming the GEMS Project Manager.

When not busy, Sandra loves to cook, practice yoga, and spend time volunteering at her two sons and husband's crew races.

"Working for NASA was my childhood dream. I was born in Costa Rica and coming to the United States was not even a possibility. But dreams may come true when you put your mind to them and continually do your best. At the very least, aiming high allows you to get that much farther than the alternative. It is an honor to be part of the NASA family."

RACHAEL CELESTINE

Electrical Engineer
(Contractor with Parsons Infrastructure and Technology)

Rachael Celestine became an electrical engineer because of her love of science and math. She has been in the consulting engineering field for eleven years, the most recent four being spent at NASA Goddard. As a member of the Parsons multidisciplinary group on site, she has developed designs for lighting and power systems for facilities critical to the Goddard mission, including office spaces, cleanrooms, laboratories, and computer rooms. Rachael's designs provide the required utility power to Goddard's highly technical spaces, so that NASA's scientists can develop their experiments and conduct the integration and testing of their instruments. She was also selected to perform the lighting design for the renovation of the new Center Director's suite, a high visibility project.

During the design process, Rachael conducts field investigations of existing building conditions and documents her findings. She then performs the load analyses for power and lighting systems, selects energy efficient electrical equipment, and develops specifications controlling the quality of the selections. As part of Rachael's design process, she must follow all safety codes. Her projects can span anywhere from 30 days to 180 days in design, depending on their complexity. Recently she has worked on several high-priority projects – the Mirror Replication Lab, the New Generation Coronagraph Lab/Eclipse Lab, and the Plasma Lab, all critical to adapting Goddard facilities to a dynamic mission environment.

Photo by Debora McCallum

Rachael in a transformer vault at Goddard, March 2011.

"Ability is what you're capable of doing! Motivation determines what you do! Attitude determines how well you do it!"

KATIE CHAKOLA

Architect
(NASA GSFC civil servant)

Katie outside the Engineering Office, March 2011.

"Are you designing the next space shuttles? New design developments on the Moon or other planets?" These are a few of the questions Katie Chakola is asked when she introduces herself as an architect at NASA Goddard Space Flight Center outside Washington D.C. Upon completion of her master's degree in architecture, Katie was presented with the idea of working for NASA. She jumped in head first and is serving as a facilities project manager with responsibilities for planning, designing, construction management, and coordination of various facilities disciplines with an emphasis in architecture. Her latest project was the renovation of Building 21 for the Heliophysics Science Department. The building renovation, which has been about a two-year effort, includes seven new labs, three new 10,000-class cleanrooms, and offices for more than 200 scientists and engineers. Working with the clients to establish their end goal for the space is part of the design process, but learning about the research/work inside the laboratory is something Katie truly enjoys. The addition of construction management into her experience is something that she loves about her job. She works through the design phase and into construction and has the benefit of seeing the finished product and handing the laboratory over to the client. Katie is thrilled about her upcoming project, which is the next new building at Goddard.

"There is no such thing as self-made. We are made up of thousands of others. Everyone who has ever done a kind deed for us, or spoken one word of encouragement to us, has entered into the make-up of our character and of our thoughts, as well as our success."

NONA MINNIFIELD CHEEKS

Technologist
(NASA GSFC civil servant)

Nona talking with Goddard patent attorney Chris Edwards at the Goddard Annual New Technology Reporting Program showcase and awards ceremony at the Newton White Mansion in Mitchellville, Maryland, November 2009.

Nona Minnifield Cheeks is the Chief of NASA Goddard's Innovative Partnership Program Office. She is responsible for directing a diverse team of engineers, physicists, and business administration professionals to: (1) oversee the management of Goddard's intellectual property portfolio, which requires an evaluation of all technology disclosures reported to Goddard; (2) identify business strategies and tactics to attract partners to help accelerate the advancement of mutual new technology development needs; and (3) promote the transfer of NASA Goddard technological breakthroughs that draw interest from the public and private communities. Additionally, Nona represents NASA Goddard on internal and external teams that are engaged in devising efficient business practices and policies relative to innovation, intellectual property management, technology transfer, and creating strategic partnerships.

Nona has over 25 years of experience in leading technology transfer initiatives for which she has served as a leader of outreach and the promotion of new technology applications and external partnership ventures. Under her direction, NASA Goddard Technology Transfer Magazine, Accomplishment Report, and technology prospectus were created to communicate opportunity and success with NASA Goddard technology transfer practices. Nona has received numerous awards and has been invited to chair and give papers and presentations around the world relative to innovation and technology transfer.

"My approach to innovative business models results from linking and maintaining diverse relationships. STEM careers are comparable or symbolic to a chain. Each discipline provides connectivity and weaves opportunity for exploring ideas and possibilities that directly and indirectly influence situations in all aspects of life. With that said, mentoring from individuals of similar and diverse backgrounds can help optimize one's outlook of challenges and opportunities as well as focus work expectations that help foster a balance of personal time."

RUTH W. CHOLVIBUL

Aerospace Engineer
(Contractor with Orbital Sciences Corporation)

Ruth relaxing with her daughter at Kennedy Space Center shortly before a successful Shuttle launch, April 2010.

Ruth W. Cholvibul has worked for Orbital Sciences Corporation Technical Service Division (Orbital TSD) and the former Fairchild Space Company since 1982. She initially worked as a thermal engineer, performing thermal analysis and design for the Solar Maximum Repair Mission. Ruth worked on the Hubble Space Telescope (HST) Servicing Missions for over ten years as a thermal engineer, systems engineer, and deputy program manager. During that time, just to name a few, she performed thermal analysis and provided launch integration and mission operations support. She has been a project manager and systems engineer on the OrbView Warfighter, where she defined performance and interface requirements for remote sensing cameras and served as the primary technical interface with instrument subcontractors for all design, test, and verification issues. Ruth is currently the Lead Systems Engineer on the GOES-R Geostationary Lightning Mapper, a new instrument for the GOES weather satellite series designed to detect lightning and improve prediction of tornadic activity.

Ruth received the prestigious Silver Snoopy Award, a special honor awarded to NASA employees and contractors for outstanding achievements related to human flight safety or mission success. In her spare time, Ruth enjoys gardening and playing the piano.

"Working as an aerospace engineer has been exciting because there is always more to learn. The engineering behind spacecraft, instruments, and launch vehicles is so complex, there are constantly new challenges. The completion of a successful launch/mission is always a huge accomplishment. Choosing a career in engineering provides a huge variety of job choices. Find the one where you can always learn new things!"

JENNY CHU

Optical Scientist
(Contractor with Orbital Sciences Corporation)

Jenny beside a photo of the Hubble Space Telescope Servicing Mission 3B, June 2011. Jenny has worked on both the Hubble mission and its successor, the James Webb Space Telescope.

Jenny Chu has been an optical scientist since 1997. Her first major effort involved providing optical design on the camera optical system of the OrbView 3 and 4 / Warfighter satellites. Until recently, Jenny worked as an optical lead in Advanced Video Guidance Sensor hardware build-up for both the Demonstration for Autonomous Rendezvous Technology (DART) and Orbital Express missions. Currently, Jenny is Orbital's Optical and Detector Systems Senior Manager and performs optical design, integration, and test on the James Webb Space Telescope.

Jenny has been awarded the Allen Prize by the Optical Society of America for her outstanding contributions to differential absorption lidar and its extension to the measurements of water vapor in the stratosphere and polar troposphere. Jenny is an avid reader and in her free time enjoys working in her garden.

"It's amazing to see our technology evolve. It encourages me to work harder so I can contribute to the next big astronomical breakthrough. We can't progress if we don't keep pushing."

MARY CLEAVE

Environmental Engineer
(NASA GSFC civil servant, retired)

Mary conducting an experiment on the Space Shuttle Atlantis in low Earth orbit, May 1989.

Mary Cleave twice flew on the Space Shuttle Atlantis as a mission specialist. She was the flight engineer and operated the robot arm on the Shuttle in 1985 and deployed the Magellan spacecraft from the Shuttle in 1989. Magellan went on to study Venus. In 1991, Mary moved from Johnson Space Center to Goddard Space Flight Center to be Project Manager on the Sea-viewing Wide Field-of-view Sensor (SeaWiFS) project. The goal of SeaWiFS was to provide global measurements of all of the plants on Earth every 48 hours. The spacecraft launched in August 1997 and operated successfully for 13 years. The data from the spacecraft are helping us to increase our understanding of climate change, oceanography, and atmospheric science.

In 2000, Mary moved to NASA Headquarters, where she began as the Deputy Associate Administrator for Earth Science and later became the Associate Administrator for Science. In the latter capacity she guided an array of research and scientific exploration programs for planet Earth, space weather, the solar system, and astrophysics. She retired from NASA in 2007.

"Working at Goddard and being part of a team that helps increase our understanding of our home planet is really rewarding, and it is also great fun."

YAIRESKA (YARI) M. COLLADO-VEGA

Space Physics Trainee
(Graduate cooperative [co-op] student at Goddard from Catholic University of America)

Photo by Jay Friedlander

Yari in front of a poster she presented on "Visualizing Vortices Caused by Instabilities along the Earth's Magnetopause" in 2010.

Yari Collado-Vega is a fourth-year physics Ph.D. candidate at The Catholic University of America in Washington, D.C. She is originally from Ponce, Puerto Rico, and has been part of the NASA Goddard family since August 2004. She is in the Graduate Cooperative (Co-op) Education Program under the Geospace Physics Laboratory. She received both Bachelor of Science and Master of Science degrees in theoretical physics from the University of Puerto Rico at Mayagüez, Puerto Rico, in 2004 and 2007 respectively, and then received a second MS degree from The Catholic University of America in May 2010.

Yari has conducted research on visualizing vortices caused by instabilities along the Earth's magnetopause, using magnetohydrodynamic (MHD) simulations. Vortices were found with both fixed and dynamic data for comparison and many curious development characteristics were identified. Her current research is based on studying Flux Transfer Events (FTEs) on the dayside magnetopause. She uses the bipolar magnetic field signatures and magnetic field strength variations to determine the velocity and direction of FTE motion, for comparison with predictions generated by different models. Yari has also been involved in education and public outreach activities for the Goddard Sciences and Exploration Directorate, in efforts to encourage middle school, high school, and college students to pursue science activities and careers.

"Being from a little island, Puerto Rico, I never imagined that I would have the opportunity to travel several times around the world to present my research results and meet all the amazing and brilliant people I have met. Sometimes I can't believe where I'm standing. Being part of the NASA family has been an amazing experience."

CARMEL CONATY

Systems Engineer and Informal Education Lead
(NASA GSFC civil servant)

Carmel speaking to a group of museum educators at the Goddard Visitor Center, March 2010.

Carmel Conaty considers herself quite fortunate to have spent much of her first nine years at NASA Goddard in a cleanroom working on space-flight hardware. As a mechanical engineer and then systems engineer, Carmel served as both a member of and lead for teams of engineers in designing, building, testing and launching flight instruments. This early work shaped her focus on producing tangible results. More specifically, while working on space-flight instruments, Carmel interacted with a diverse range of scientists and worked on missions that included observing cosmic X-ray sources, transferring superfluid helium in space, and laser-mapping the surface of Mars. She then became a manager of one of Goddard's systems engineering organizations.

Carmel's focus changed from engineering to education while in a leadership-development program at NASA Headquarters, where she worked on the Exploration Systems Mission Directorate education program. This, along with becoming a parent, cemented her passion to engage the next generation in science, math, technology, and engineering. When she returned to Goddard in 2005, Carmel was given the opportunity to provide leadership to the Goddard Visitor Center and in 2009 became the Office of Education Lead for Informal Education. In her current role, she takes a systems engineering approach to the deployment of NASA education programs, new content and discoveries, and resources.

As the child of a teacher, Carmel has always loved education. Her current job enables her to integrate her passion for NASA's science and engineering with her passion for inspiring, engaging, and educating the next generation of NASA scientists and engineers.

"Using NASA's mission, I strive to engage people so that they are inspired to contribute to the future of science and engineering."

MARTHA DAWSEY

Optical Engineering Graduate Student
(Co-op graduate student at Goddard, from the College of Optical Sciences, University of Arizona)

Martha using a laser range finder during a field test at Eglin Air Force Base in Florida, September 2004.

Martha Dawsey is a graduate student in the co-op program at NASA Goddard. She is a part of the Components Group in the Optics branch, but is co-located with the laser remote sensing science group, which gives her a broad range of opportunities. During her brief tenure at Goddard, Martha has been working on an optical design for a methane trace gas lidar and is next planning to assist in the assembly and testing of the system. She will be included on the test flights in summer 2011, spending two weeks flying out of Palmdale, California, with the instrument that she's helped to design and build. In addition to this, she's been able to assist in the metrology of various components with the Optics branch and has had the opportunity to be trained on two different spectrometers.

"In my co-op experience, I feel like I have the best of both worlds. I have the full expertise and considerable resources of the optics branch to draw on, but I'm working on smaller projects with more opportunities for hands-on research."

GEORGIA A. DE NOLFO

Astrophysicist
(NASA GSFC civil servant)

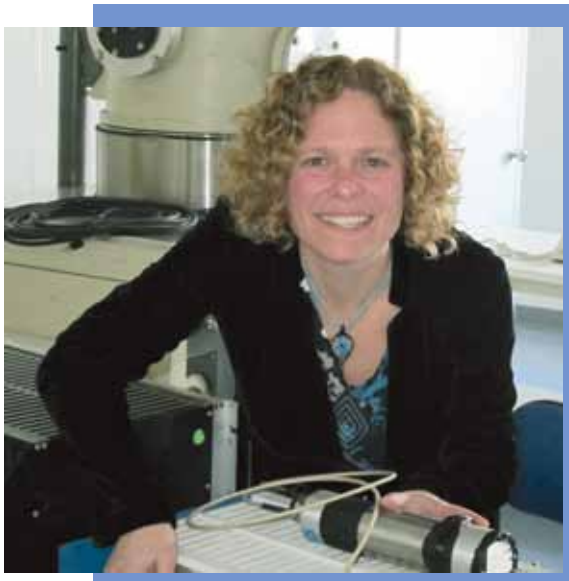


Photo by Eric Christian

Georgia in her laboratory at Goddard, preparing a gamma/neutron monitor for calibrations, March 2011.

Georgia de Nolfo has worked for over 20 years as an experimental research astrophysicist using data from space-based and high-altitude balloon-borne instruments to investigate the origin of energetic particles (cosmic rays) within our Galaxy and solar system. Cosmic rays span the periodic table, travel at almost the speed of light, and are thought to originate from dynamic processes such as solar flares, coronal mass ejections, shocks forming at the heliospheric boundary, and supernovae. Balloon campaigns are one of Georgia's research highlights, providing the opportunity to experience the challenges of two-to-three-month integrations in remote locations, the all-night surveillance of flight conditions, the balloon launch and recovery with small "chase" planes, unwieldy trailers, and often inaccessible terrain, and the rewards of data analysis and interpretation.

Currently, Georgia is using PAMELA (short for Payload for Antimatter/Matter Exploration and Light-nuclei Astrophysics), ACE (short for Advanced Composition Explorer), and other coordinated observations from space and ground instrumentation to build a more comprehensive picture of how solar energetic particles get accelerated. Georgia spends her time between data analysis and instrument development, focusing on the development of particle detectors and gamma-ray and neutron imaging technologies.

"Being an experimental astrophysicist at NASA is a extraordinary adventure filled with challenges and rewards and opportunities at every turn to improve our understanding of the Universe and the world around us."

SHIRLEY DION

System Safety Engineer
(Contractor with SRS Technologies)

Photo by Warren Shultzaberger

Shirley in front of the GPM Engineering Test Unit, after it completed centrifuge testing at Goddard, March 2011.

Over the 25 years that Shirley Dion has served as a System Safety Engineer contractor, she has traveled to France, Italy, Canada, the Marshall Islands, and Japan to support the safe development and integration of instruments and spacecraft to launch vehicles. So what does a System Safety Engineer do? Shirley says that her position is similar to a System Engineer but with a different focus. System Safety Engineers, like System Engineers, need to understand a variety of engineering disciplines such as electrical, mechanical, thermal, propulsion, and radio frequency (RF) engineering, to name a few, and the interactions between spacecraft subsystems. Shirley finds that communication with fellow engineers is an important aspect of her job. Safety is not a single person's job but rather a team effort. A System Safety Engineer evaluates the design and integration of a spacecraft and asks "What could go wrong, and if it does go wrong, what happens next?" It requires a unique way of thinking. Once potential failures can be identified, they can be controlled or eliminated by engineering design, test, inspection, or operational procedures.

Shirley finds her career energizing because each day is different. Even after 25 years, she is still learning about new hardware and processes. Shirley is currently working on the Global Precipitation Measurement (GPM) mission, which is a collaborative effort between NASA and the Japan Aerospace Exploration Agency (JAXA). This mission is scheduled to launch in 2013. Each of the two agencies is providing an instrument, NASA is providing the spacecraft, and JAXA is providing the launch vehicle. Shirley and the GPM safety team traveled to Japan to present the hazard assessment for the GPM Mission, which was approved by JAXA.

"Effective communication takes teamwork. Safety is everyone's job."

ANNE DOUGLASS

Atmospheric Chemist
(NASA GSFC civil servant)

Photo by Jason Pier

Anne next to the Dynamic Planet outreach tool at Goddard, June 2010.

Anne Douglass uses a computer model of the Earth's atmosphere and satellite data to study the stratospheric ozone layer. She is also the Project Scientist for an Earth-observing satellite mission called Aura. Aura carries four instruments that measure gases important for the ozone layer, air quality, and climate. Anne and her colleagues use measurements of ozone and other important trace gases from instruments on Aura and other satellites to understand the processes that control the ozone layer that protects the Earth's surface from too much ultraviolet radiation. She and coworkers use that information to understand how the processes should be included in the computer model so that the simulations of the atmosphere give reliable estimates of the future of the ozone layer.

As Project Scientist, Anne has responsibilities to the Aura team. She coordinates meetings of her Aura colleagues to share their research. As Project Scientist, she also has the privilege of sharing scientific discoveries made by the Aura team with other scientists and also with teachers, students, and interested people everywhere. Anne and two of her daughters contributed essays to a collection *Motherhood, the Elephant in the Laboratory,* edited by Emily Monnoson. In this book, women share their stories as they struggle to balance their roles as scientists and mothers.

"When in graduate school, I decided to channel my love of physics to study the Earth's atmosphere. I never imagined I would be so privileged to work at Goddard on a project like Aura that brings information to scientists all around the world."

DARILYN M. DUNKERLEY

Systems Engineer
(Contractor with TASC, Inc.)

Photo by Bree Layton

Darilyn at a recent meeting at the NASA IV & V Facility in West Virginia, April 2011.

In the 1960s, a young girl's father worked on the Lunar Module, as a thermodynamic engineer. With each launch of the Apollo spacecraft, Darilyn Dunkerley was certain that her father built the whole spacecraft. This is part of the magical cosmic thinking from which a girl's dreams are made.

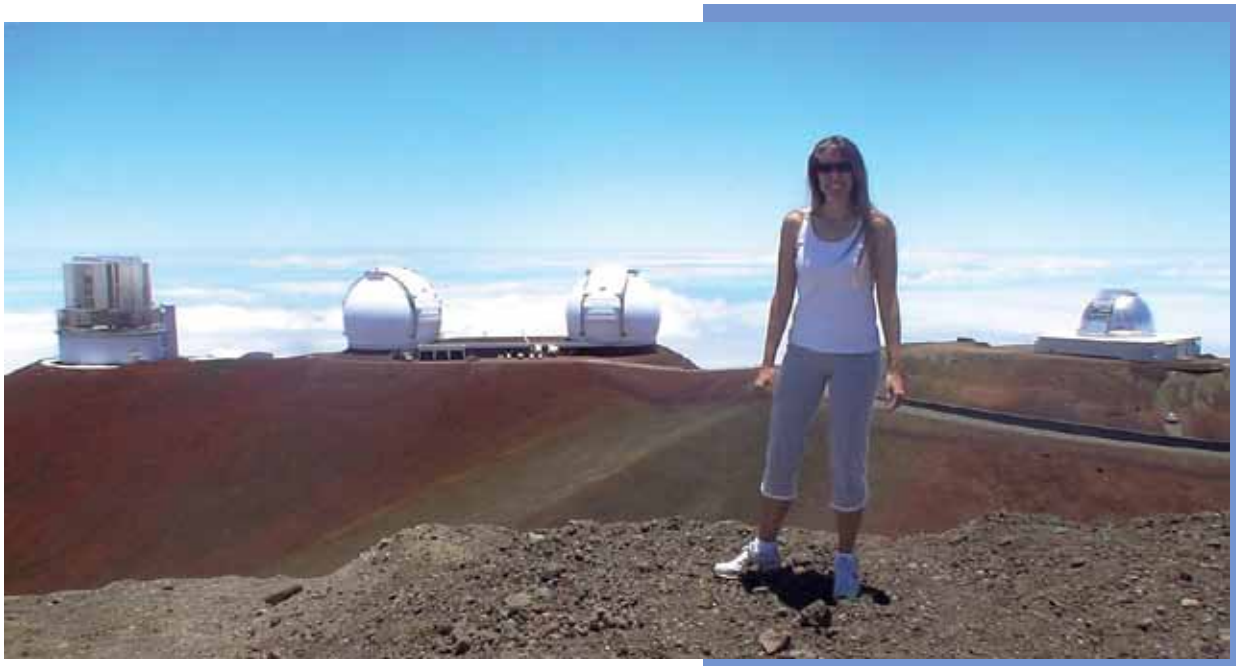
As a young computer professional, Darilyn began her own NASA career in 1988 as a developer for flight software used on the Space Shuttle mission that immediately followed the final Challenger mission. Darilyn worked on-site at NASA Goddard as a contractor in the NASCOM organization. To some degree it seemed like the family business.

More than 20 years later, Darilyn is working at the Goddard-managed NASA Independent Verification and Validation (IV & V) Facility in Fairmont, West Virginia, as a systems engineer providing support to ensure mission safety. Darilyn still considers it an honor and privilege to have the career she has. There aren't many jobs where you are asked to contribute to the discovery of our universe!

"NASA is unique in its ability to stir the human spirit to strive to discover the unknowns of the universe. My hope is that it continues to interest future generations to discover even more about our universe."

KELLY E. FAST

Planetary Scientist
(NASA GSFC civil servant)



Kelly on 13,796-foot Mauna Kea in Hawaii, with the National Astronomical Observatory of Japan's Subaru Telescope, the W. M. Keck Observatories, and the NASA Infrared Telescope Facility.

Kelly Fast grew up with views of both the Hollywood sign and the Griffith Observatory outside her bedroom window. The observatory view won out, due possibly to a heavy dose of *Star Trek* at a young age. Instead of going out on Saturday nights like many teenagers, Kelly would set up her telescope to look at whatever could be seen through the Los Angeles light pollution. It was just a preview of what was to come.

Kelly studies planetary atmospheres using NASA Goddard instruments such as the Heterodyne Instrument for Planetary Wind And Composition (HIPWAC) spectrometer at observatories on Mauna Kea on the Big Island of Hawaii. She conducts the only direct measurements of ozone on Mars possible from the telescopes on Earth, and she works with the modeling community to study Mars' atmospheric chemistry. She has arranged coordinated campaigns between HIPWAC at the NASA Infrared Telescope Facility and the Mars Express spacecraft in orbit around Mars. Kelly has studied the effects on Jupiter's stratosphere of the 1994 Shoemaker-Levy 9 and 2009 impacts and was involved in the first measurements of winds on Saturn's moon, Titan. Thanks to her production of a YouTube music video called "Hotel Mauna Kea", she cannot walk through a planetary conference or the Hilo airport without being recognized. Her kids find the whole thing really embarrassing and refuse to allow her to show it during classroom visits.

"I am so grateful for supportive colleagues during my many years of balancing research and family. I have the amazing privilege of studying the planets, yet in my eyes my kids are my most distinguished collaborators!"

SHARON MARIE GARRISON

Advanced Technology Program Manager
(NASA GSFC civil servant)

Photo by Donna Smith

Sharon in her office at Goddard, April 2011.

Sharon Garrison began her career at Goddard in 1980 as a polymer chemist responsible for testing and preparing polymers for space flight application and use. Subsequently, she became the Agreements Manager for space flight tracking, communications, data acquisition, and flight dynamics support. Her duties included oversight and update of all Goddard agreements with national entities, such as U.S. government agencies, universities, and laboratories.

Sharon's favorite role was as the Contracting Officer's Technical Representative and Agency Coordinator of the contractor-managed-and-operated NASA Institute for Advanced Concepts (NIAC). The purpose of NIAC is to revolutionize advancement in aerospace performance as it aligns with NASA's missions and goals, and its focus is not on technology but rather systems and architecture. Sharon was the NIAC Director's point of contact into the Agency, connecting NIAC with NASA Headquarters and all NASA Centers. She was responsible for technical and financial contract oversight and evaluation, and she prepared the technical portions of the Request for Proposals for the NIAC contract and coordinated the technical review of these proposals. Sharon was at the helm from the establishment of NIAC in February 1998 through its initial closure due to budget cuts in August 2007. NIAC and its funded studies received frequent recognition for their innovative approaches through many national and international papers, press, and scientific publications. Because of its success and importance, Congress has mandated the restart of NIAC, and the NASA Headquarters Office of the Chief Technologist has recently initiated this restart.

"The work empowered through NIAC will change the world and the way the world operates. Many of the NIAC funded advanced concepts will require global participation and cooperation. These are big enough reasons for me to wake up every morning. My advice to others: If you want to find your dream job, get clear on your personal purpose for working, your skills and attributes, and how you might use them in the environment you are seeking to affect. Then, seek out opportunities in that environment to apply this knowledge."

HOLLY GILBERT

Solar Physicist
(NASA GSFC civil servant)

Holly speaking on NASA Television about a total solar eclipse, August 2008.

Holly Gilbert wears many hats in the Heliophysics Science Division (HSD) at Goddard. As a solar scientist, she utilizes the amazing solar data produced by both spaced-based observatories (such as the Solar Dynamics Observatory) and ground-based observatories. Since mentoring is of great importance to her, Holly also involves undergraduate and graduate students in her solar research. In addition to research, Holly, who is the HSD Associate Director for Science, helps run the HSD and manages its education and public outreach (E/PO) activities. Her involvement in E/PO provides many opportunities for Holly to interact with the public through various outreach activities and media outlets. Her dedication to E/PO was recognized in 2007 by the naming of a solar telescope in her honor at the St. George Observatory in Louisiana. Holly also acts as the Deputy Project Scientist for Solar Orbiter, a collaborative mission between NASA and the European Space Agency (ESA) that has an anticipated launch no earlier than 2017. This role allows her to keep a foot in the flight projects.

"A career as a scientist can be as exciting and fluid as the scientific discoveries themselves. It is the journey that drives me to evolve as a scientist."

HEATHER GOO

Patent Attorney
(NASA GSFC civil servant)

Heather in her office at Goddard, April 2011.

What can you do with an engineering degree and a law degree? Be a patent attorney. That is Heather Goo's role as one of the attorney advisors at NASA Goddard. Heather works with technologists across the Center and computer scientists and engineers from a variety of disciplines. She serves as an advisor on matters related to intellectual property, including traditional patent, copyright, and trademark protection, data rights protection, licensing, and software release. Working with Center technologists requires that Heather understand the technical and engineering aspects of the subject matter as well as the potential legal opportunities and impact. She spends much of her day working with scientists and engineers investigating and discussing avenues for protection and implementing strategies to protect, advance, and commercialize Center technologies.

Heather's career has provided the unique opportunity to interact with people who are leading research and developing technology at the forefront of science. What an amazing place to be!

"My career is an unusual blend of science and law. Each day is different - as the technology, the issues, and the people involved vary. There is never a dull moment."

KAREN HALTERMAN

Flight Project Manager
(NASA GSFC civil servant)

Karen in front of the Magnetospheric Multiscale (MMS) logo outside her office at Goddard, January 2011.

Karen Halterman has been the Project Manager of the Magnetospheric Multiscale (MMS) Project since 2006. MMS is a space physics research mission consisting of a constellation of four identical satellites that will study magnetic reconnection in the Earth's magnetosphere. The project is currently in the flight hardware manufacturing phase. Launch of all four satellites in one Atlas V is scheduled for 2014. The MMS spacecraft are built in-house at Goddard, and the instruments are procured from industry. Karen is responsible for the development of the MMS space and ground segments on schedule and within cost, meeting the science requirements defined by NASA Headquarters. She accomplishes this together with the project staff of senior spacecraft and instrument managers and the resources team. From 2001 to 2005, Karen was the Project Manager of the Polar Orbiting Environmental Satellite (POES) Operational Environmental Satellites Project, where she was responsible for the launches of the NOAA-L, NOAA-M, and NOAA-N environmental and weather satellites.

Karen started working at Goddard as a contractor in 1976 and became a civil servant in 1989. Her career started in software development and advanced into progressively more technical team leadership and management roles.

"People are the single most important part of any project. The teamwork needed to accomplish large scale NASA missions is the most rewarding aspect of project management to me."

CHANTÉ HILL

Engineer
(Contractor with Parsons Infrastructure and Technology)

Photo by Debora McCallum

Chanté working on a new cleanroom laboratory facility in April 2011.

Chanté Hill began working for Parsons at NASA Goddard as an Engineer Associate on Christmas Eve of 2007. That's when she discovered she had a *lot* to learn. Working within the Facilities Management Division at NASA, Chanté has experienced a wide range of opportunities: from designing cleanrooms, to office renovations, to upgrading the fire alarm systems of the major buildings on the Center. Chanté has also had the chance to work as a Fire Protection/Fire Alarm engineer "in training". In 2009, she also passed the Leadership in Energy and Environmental Design (LEED) exam aided by the Parsons training program. She is currently a member of NASA Goddard's Electrical Safety Committee.

Chanté's job entails surveying existing field conditions, documenting these conditions, performing any necessary calculations for modifications to be made, detailing the specifications of the modifications, and making sure her design is implemented/installed correctly with the right materials. The upgrades and modifications that she helps make to existing facilities aid in keeping all of NASA's projects running smoothly.

"Engineering is a broad field with plenty of opportunity to perform a wide range of duties; you never have to feel limited, there are always new things to learn and new ways to grow."

N. CHRISTINA HSU

Atmospheric Scientist
(NASA GSFC civil servant)

Christina during a field experiment on the dust over the deserts of the United Arab Emirates, August 2004.

Christina Hsu develops satellite algorithms to retrieve the properties of aerosols from space. Aerosols are tiny air-borne particles such as mineral dust and smoke that could be generated by either natural or manmade sources. She also spends lots of time studying how these tiny particles affect the climate by redistributing solar energy within the Earth's atmosphere and by changing the thermal contrast between land and ocean. These aerosol data derived from satellites provide important operational uses such as monitoring the movements of dust outbreaks and smoke generated from forest fires; in particular, they help to improve the forecast and warning systems of these disaster events. Christina is also the Deputy Project Scientist for NASA's NPP mission, which stands for the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project and will continue key data records that are critical for global change science and weather forecasting.

"I always have immense curiosity about how this universe works. During my career at NASA, I found out that you not only get paid to do what you love, but the fruits of your research actually could also benefit society and help people all over the world. Who knew!"

GAIL SKOFRONICK JACKSON

Atmospheric Scientist
(NASA GSFC civil servant)

Gail near a measurement site for falling snow, at Mount Zugspitze, Germany, April 2011.

Growing up in northern Florida, Gail Skofronick Jackson was always interested in the weather events of snow and hurricanes, and that interest has continued throughout her life. Gail uses her electrical engineering and science skills to design instruments for remotely measuring the Earth's rain and falling snow. Prior to embarking on falling snow research, she investigated frozen drops in the upper parts of hurricane clouds. Her work is important to society, as snow packs provide a significant source of fresh water in some regions, falling snow can disable transportation flow, and hurricanes can destroy communities.

Gail did not know exactly what she wanted to do for a career until she was a junior in college. At NASA, she is the Deputy Project Scientist for the Global Precipitation Measurement mission scheduled for launch in 2013, and as such she interacts with managers, scientists, innovators, and engineers. Combining science, engineering, and weather, she considers her career to be a great mix of travel, fun, challenge, and inspiration.

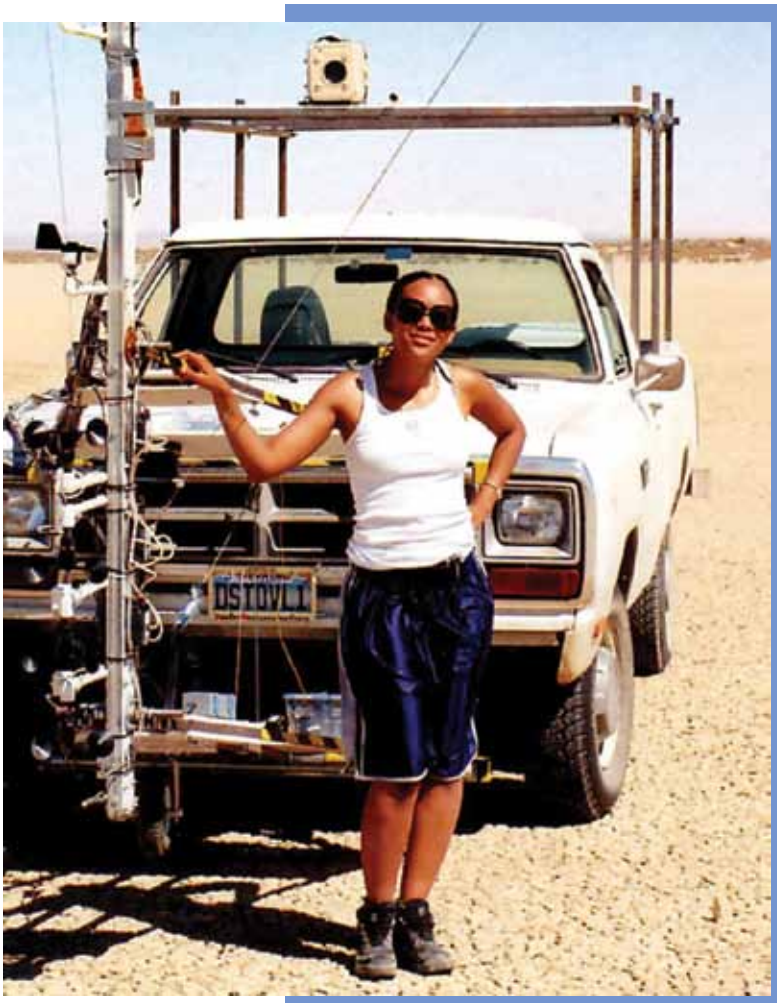
"The beauty in and complexity of nature has always fascinated me. Every day at NASA, I get to explore exquisite snowflakes and the subtleties of cloud formation."

TELANA JACKSON

Planetary Scientist
(NASA GSFC civil servant)

Telana Jackson began her Goddard career by performing Mars-analog dust devil studies in California, Arizona, and Nevada with a highly sensitive, portable electrometer that she designed. The system was the first to collect electric field data without saturating in the electrified dust features. Since then she has been working to miniaturize and ruggedize the electrometer system for astronaut use on Extravehicular Activities (EVAs) in lunar and asteroid experiments.

While working toward her doctorate of engineering degree, Telana developed a model called the Dust Devil Electron Avalanche Model (DDEAM), which solves eight one-dimensional differential equations simultaneously for values to characterize the electron density, the densities of constituents, and their products due to electron/molecule source and loss interactions in the Martian atmosphere. Loss processes have not been included in previous models. DDEAM also models the developments of a plasma 'glow' discharge and Mars methane destruction as functions of the electric field.



Telana preparing to chase dust devils in the Mojave Desert, August 2004.

Telana is currently a co-investigator on DREAM (which stands for Dynamic Response of the Environment at the Moon) with the National Lunar Science Institute. She is aiding in the advancement of a lunar surface charging model, showing how astronauts and rovers charge as they move along the lunar surface in plasma-current-starved regions such as the lunar nightside and inside craters.

When not engaged in scientific activities, Telana likes to watch movies and documentaries, read, model (in photo shoots and on the runway), play piano, sew, craft, and toy with Play Station 3 (ps3) games.

"I like the fact that at Goddard I get to see all different sides of the science; I get to do everything."

CHRISTYL JOHNSON

Executive Manager of all STEM Fields at GSFC
(NASA GSFC civil servant)

Christyl Johnson has had many exciting roles in her 20-year NASA career. She began her career at Langley Research Center, designing and building laser systems for remote sensing of the atmosphere. While at Langley, she also performed project management for flight instruments, served as program manager for all Center laser research, and led a group of engineers and technicians in her supervisory branch management role. At NASA Headquarters, Christyl served as Associate Director for all Earth exploratory missions, the Agency's Deputy Chief Engineer, and the Assistant Associate Administrator for NASA. This position led to a two-year assignment as the Executive Director of the National Science and Technology Council at the White House.

Christyl and her son during a rehearsal for the Engineer of the Year Awards at the Baltimore Convention Center, February 2008. Christyl is well aware that exposure is a great way to motivate youth to pursue STEM careers.

All of this experience has prepared her for her most amazing challenge yet: serving as the Deputy Director for Science and Technology at NASA Goddard since December 2010. She reports directly to the Center Director and has executive leadership and general management responsibility for Center research and development activities.

Christyl also has a passion for education and outreach, and has always used her various positions to help inspire students, encourage employees, and engage communities and partners. She holds a bachelor's degree in physics and a master's degree in electrical engineering, and is currently pursuing a Ph.D. in systems engineering at George Washington University.

"In my career, I have been presented with many opportunities, challenges, and obstacles. I have been determined to work around those who have chosen to be obstacles, but I have also had many people who have opened doors to enable my dreams. One thing that I have learned over the years is that nothing is powerful enough to stop you from achieving your dreams, except for you."

FELICIA JONES

Instrument Systems Engineer
(NASA GSFC civil servant)

Felicia in her office at Goddard, April 2011.

In 2010 Felicia Jones was appointed as the first female African American Deputy Director of the Applied Engineering and Technology Directorate at Goddard. Felicia provides end-to-end engineering support for the development of flight missions, including sounding rockets, balloons, and new technologies to study the Earth, the Sun, our solar system, and the universe. In 2008 she was appointed Deputy Director of the Astrophysics Science Division, where she provided leadership in astronomy, astrophysics, and fundamental physics to discover the origin, structure, and evolution of the universe and to search for Earth-like planets.

In her 23 years at NASA, Felicia has been responsible for the conceptualization, design, fabrication, integration, test, and launch of numerous scientific flight instruments. She was an Instrument Engineer and Instrument Manager on the Infrared Array Camera (IRAC), one of three science instruments aboard the Spitzer Space Telescope, the last of NASA's Great Observatories, which successfully launched from Cape Canaveral Air Force Station. Under her leadership, NASA has been responsible for the successful delivery of space flight instruments to national and international collaborators, such as the delivery of the Mercury Laser Altimeter (MLA) to the MErcury Surface, Space ENvironment, GEochemistry, and Ranging (MESSENGER) mission and the delivery of Earth-observing instruments to the Tropical Rainfall Measuring Mission (TRMM).

"NASA has given me the opportunity to discover and explore in ways that I never imagined. Every day is different and challenging – this is music to my soul."

SARAH JONES

Research Astrophysicist
(NASA GSFC civil servant)

Sarah Jones works in the Space Weather Laboratory at NASA Goddard, where she develops instrumentation to image the aurora and airglow from sounding rockets and small satellites. Studying the aurora is a way of remote sensing processes that occur in the Earth's magnetosphere. Sarah has traveled to various locations in Alaska to provide support for several sounding rocket missions. Working in the field in Alaska is always an adventure, with temperatures dipping below -50°F, volcanic eruptions delaying travel plans, and saunas taking the place of showers at research stations with no running water! At Goddard, Sarah currently is analyzing data from the Thermospheric Temperature Imager (TTI) on the Fast, Affordable Science and Technology Satellite (FASTSAT) to measure atmospheric temperatures from Doppler-shifted airglow emissions. Sarah obtained a Ph.D. in physics from the University of New Hampshire in 2010 for a study of space- and ground-based measurements of pulsating aurora.

Photo by Rebecca Roth

Sarah with colleague Marcello Rodriguez in her office at Goddard, February 2011.

"One of the things I love about the NASA Sounding Rocket Program is that it provides the opportunity to experience a mission from the earliest stage of proposal through design, building up, testing, and integration of the instrument up to launch, data acquisition and analysis, and publication and presentation of results. This is an invaluable experience for those of us working toward a career as Principal Investigators of future missions."

ANGELITA (ANGIE) CASTRO KELLY

Instrument Systems Engineer
(NASA GSFC civil servant)

Photo by Warren Case

Angie in front of a mural depicting the two International Earth-Observing Constellations, September 2010. Each constellation consists of several satellites that fly within seconds to minutes of each other to enable concurrent observations.

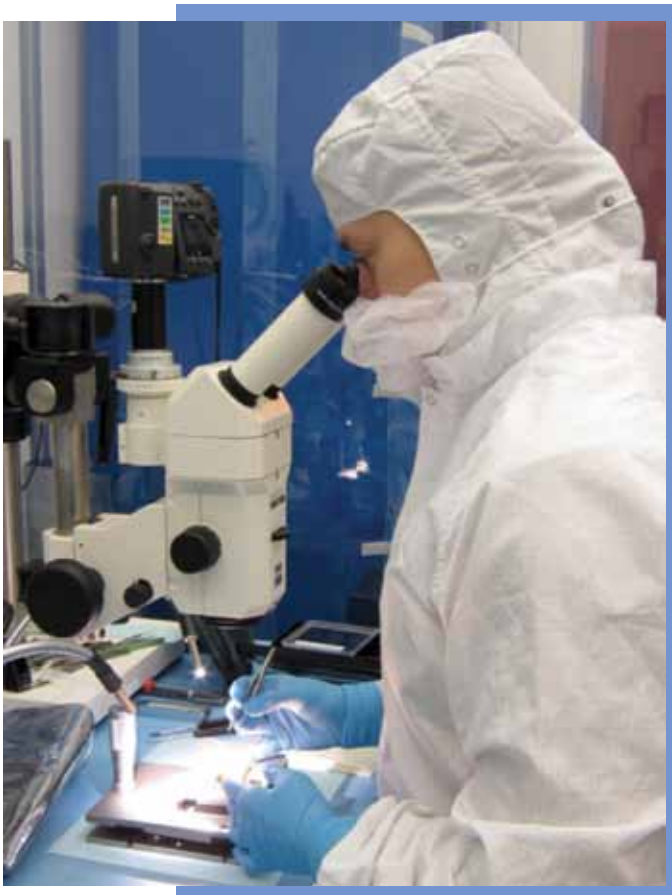
Before becoming the first woman Mission Operations Manager (MOM) for the Earth Observing System (EOS) Program, Angie Kelly was the Project Manager of the highly successful Shuttle/Spacelab Data Processing Facility, which she helped develop. She learned how to work with science users to understand their requirements and negotiated with NASA Johnson Space Center, NASA Marshall Space Flight Center, and NASA's International Partners in Germany and Japan. She utilizes these skills today as the EOS Science Interface Manager and as the MOM for the International Earth-Observing Constellations. She led the development of the EOS mission operations concept and the key agreement documents for flying the satellites of the Afternoon Constellation (or A-Train) safely. In fact, Angie is responsible for managing the configuration of the satellites to ensure safety. She has conducted several mission operations working group meetings, with a diverse group of engineers and scientists in the U.S., the Netherlands, France, Japan, United Kingdom, and Argentina, and she has presented talks at many international and U.S. conferences.

Angie married her physicist-husband while in graduate school and joined NASA after the birth of their third child. Having a degree in mathematics and physics and being able to communicate well both verbally and in writing has provided her with a solid foundation for her NASA work. Her favorite quote is Robert F. Kennedy's "Some men see things as they are and ask why, I dream things that never were and say, why not."

"It is possible to have both marriage and a career. Taking off a few years to have children has been worthwhile. Balancing career and family life is challenging but doable."

CAROLINE KILBOURNE

Physicist
(NASA GSFC civil servant)



Caroline in cleanroom garb, preparing for the installation of an engineering model calorimeter array into the Astro-H detector assembly at Goddard, November 2010.

Caroline Kilbourne develops sensitive X-ray detectors for use on orbiting observatories for astrophysics. These detectors are actually thermometers. They are directly thermometers because they register a temperature change when they absorb individual X-ray photons, and these pulses in temperature indicate the energy (or 'color') of the X-rays, allowing acquisition of a high-resolution X-ray spectrum. They are also indirectly thermometers because one of the many characteristics that can be inferred from an X-ray spectrum is the temperature of the object that emitted those X-rays. The detectors operate below 0.1 K, close to the lowest temperature possible, and the temperature changes only by about one-thousandth of a degree when an X-ray is absorbed. But X-rays are emitted by hot gas with a temperature of over a million degrees. Such hot gas is found falling into black holes and neutron stars, in the coronae of stars and the winds of star-forming galaxies, and in the remnants of exploded stars.

This type of detector is called an X-ray calorimeter, and Caroline has developed various implementations of this technology over the last 24 years. Caroline is currently the lead detector scientist for the Soft X-ray Spectrometer (SXS) instrument for the Astro-H mission. She is looking forward to applying these very cold sensors to detailed investigations of the very hot, X-ray-emitting Universe.

"Growing up I discovered I enjoyed solving puzzles of all kinds. Now as a scientist I am paid to solve puzzles. Very few of those puzzles reveal anything fundamental about nature; in order to get to the big questions, a lot of other puzzles need attention. These include figuring out the physics and optimizing the design of the detectors, debugging data-analysis programs, diagnosing equipment or processes that have stopped working, organizing research teams, strategizing over research proposals, and optimizing schedules. Fortunately, I still enjoy puzzles of ALL kinds."

ANNE KINNEY

Astrophysicist
(NASA GSFC civil servant)

Photo by Jay Friedlander

Anne in her office at Goddard with a Viking mosaic of Mars in the background.

Anne Kinney is the Director of NASA Goddard's Solar System Exploration Division, a group that designs, builds, launches, and operates instruments to every planet in the Solar System, with 90 instruments launched and operated to date and ten instruments currently being built. Prior to her current position, she was the Director of the Universe Division in the Science Mission Directorate at NASA Headquarters, where she oversaw the Hubble Space Telescope, Chandra X-ray Observatory, Spitzer Space Telescope, Stratospheric Observatory for Infrared Astronomy (SOFIA), and Fermi.

Anne is an expert in extragalactic astronomy and has published 80 papers in refereed journals on quasars, blazars, active galaxies and normal galaxies, and signatures of accretion disks in active galaxies. She has demonstrated that accretion disks in the center of active galaxies lie at random angles relative to their host galaxies.

Anne was Instrument Scientist on one of the original instruments to fly with the Hubble Space Telescope, the Faint Object Spectrograph. She worked in Education and Public Outreach with the Hubble Space Telescope and was involved in creating the program Amazing Space (http://amazing-space.stsci.edu/), an educational website for children to learn basic principles of science, math, and astronomy. Anne is originally from Wisconsin, and she received a Bachelor of Science degree from the University of Wisconsin prior to studying in Denmark for several years at the Niels Bohr Institute and then receiving a doctorate from New York University. She has served on the Council of the American Astronomical Society, has been a visiting scholar at the Institute of Astronomy in Cambridge (1997-1999), and serves on the editorial board of Astronomy Magazine (1998 – present).

"I see science as a door-opener for people. A degree in science can prepare a young person for a wide range of career options. Scientific research allows us as a people to understand the world we live in. And that same scientific research can be applied to our daily lives to improve the way we live and to make things possible that were unimaginable by our ancestors."

LORA KOENIG

Glaciologist
(NASA GSFC civil servant)

Lora on the Greenland ice sheet, January 2010.

In 2010 Lora Koenig spent one and a half months in temperatures below freezing on top of the Antarctic Ice Sheet. The year before, she spent four months on top of the Greenland Ice Sheet with temperatures below -4 ° F and in polar darkness. In 2011 she will go bi-polar, spending one month in Greenland and two in Antarctica. Why does she spend so much of her time in these inhospitable places? Lora has a career as a scientist in the Cryospheric Sciences Branch at NASA Goddard. Her job is to monitor recent changes over the polar ice sheets and other areas of frozen water, like glaciers, sea ice, and seasonal snow.

The polar regions act as refrigerators for the Earth, and changes in the polar regions can change sea level and the rate at which the Earth's climate can warm or cool. Lora's research has recently reached new heights; she is the Deputy Project Scientist for NASA's Operation IceBridge, an airborne mission that monitors the polar regions using aircraft equipped with lasers, radars, and a gravimeter. Working with Operation IceBridge requires that Lora understand her science as well as how aircraft operate. When she is not in the field or in the air, Lora is in front of a computer analyzing the data she has helped to collect. Lora's career as a physical scientist has taken her to many unique, adventurous, and cold places.

"My career stemmed from a love of skiing and math. I never dreamed that the two could lead to such an exciting career at NASA."

ANNE KOSLOSKY

Systems Engineer
(NASA GSFC civil servant)

Anne at Kennedy Space Center for the launch of STS-133, February 2011. Anne has witnessed the last five Shuttle launches with family and friends.

Anne Koslosky, a second-generation employee at Goddard, began her career in the Special Payloads Division. This provided her with the opportunity to be involved in numerous missions. For instance, she was the technical liaison for a Get Away Special (GAS) experiment for STS-77, and for STS-95 she commanded the deployment of a small Department of Defense spacecraft, the Petite Amateur Navy Satellite (PANSAT). After leaving the Special Payloads Division, she became a spacecraft operator and successfully commanded the Fast Auroral Snapshot Explorer (FAST) spacecraft on its initial launch operations. In addition, Anne's flight software code resides on the Hubble Space Telescope's Advanced Camera for Survey instrument. As the test team lead for the MESSENGER spacecraft's Mercury Laser Altimeter, Anne successfully delivered the fully qualified software. In preparation for on-orbit sustaining engineering, she coordinated and verified the flight software test-bed for the acceptance testing aboard MESSENGER, inserted into Mercury orbit on March 17, 2011. As a Systems Engineer for the Instrument Design Lab, Anne completed end-to-end data rate throughput analysis, on-board science analysis/compression trades, central processing unit (CPU) and memory recommendations, software functionality and operation modes, hardware and software interface designs, and software risk identifications. Additionally, she provided test bed architecture, staffing and cost estimates for over fifty instruments on numerous spacecraft missions. Anne was also responsible for the Spacecraft Environment Testbed maintenance for flight code changes for those missions.

In addition to volunteering for NASA Education and Public Outreach, Anne also finds time to volunteer for Big Sisters, the Washington National Zoo, and Girl Scout Troop Lead #5092 / St. Matthias School. On February 11, 2010, Anne captured the unique photograph "SDO Destroys the sundog," as the Atlas V rocket carrying the Solar Dynamics Observatory (SDO) destroyed a sundog with its rippling flurry of shock waves. Anne has learned technologies such as visualization tools, twitter, facebook, flickr, and youtube to inspire the next generation.

"Celebrate life's brilliant colors as if life is black and white, with a rippling flurry of shock waves..."

BARBARA LAMBERT

Technical Photographer
(Contractor with ASRC Research Technology and Solutions)

Photo by Chris Gunn

Barbara (on right) and a colleague with the Solar Dynamics Observatory before its launch, March 2009.

With an unconventional resume, Barbara Lambert breaks the engineering mold while still serving as an integral and resourceful part of NASA Goddard. She began 30 years ago and found her niche in documenting the building, testing, and integration of space flight hardware. Working closely with the Goddard engineers and scientists, Barbara photographs engineering parts, hardware test configurations, and the integration of flight components during all phases of spacecraft assembly. These photos are used by project personnel for real time analysis, training, and anomaly resolution. Certification for working in cleanrooms, confined spaces, and often at extreme heights was required for her to access many of the facilities not only at Goddard but at NASA's Kennedy and Johnson Space Centers.

Barbara's career has provided some very unique opportunities. She has worked with astronauts during their training for the Hubble Space Telescope servicing missions, supported payload processing operations at Kennedy Space Center, and monitored photographic imaging stations in the Payload Operations Control Center in Houston. Barbara received the prestigious Silver Snoopy Award for her outstanding work and professional dedication to the space flight program. When not documenting flight hardware, Barbara is a volunteer for educational outreach initiatives to help inspire students and encourage them to seek careers in science, math and engineering.

"Take advantage of opportunities offered during your career, even if it takes you out of your comfort zone. The most challenging ones are usually the most rewarding!"

NANCY LAUBENTHAL

Computer Scientist
(NASA GSFC civil servant)

Photo by Pat Izzo

Nancy in her office at Goddard, with the EGRET All Sky Map in the background, April 2011.

Nancy Laubenthal serves as the Deputy Chief of the Computational and Information Sciences & Technology Office. This Office provides Supercomputing, High End Networking, Information Technology (IT) Security, and Information Sciences Research solutions to the Sciences and Exploration Directorate (SED) at NASA Goddard. Nancy manages Directorate-wide IT initiatives. These include leading the SED IT Council, ensuring that strong IT Security measures are created and applied, and overseeing projects, like the development of a virtual machine computing environment for scientific research and the consolidated website restructuring. She is responsible for implementing IT changes driven by both advancing technology and Federal requirements, which includes exploring how to incorporate cloud computing and other types of virtualization innovations to the organization.

When Nancy entered management in 1983, there were very few women managers working at NASA. Since then she has seen the dawn of the personal computer, the UNIX workstation, the worldwide Web, and women in increasing numbers join the ranks of management, science, and engineering at NASA. Nancy started her career doing scientific data analysis programming for cosmic ray, X-ray, and gamma ray missions. Her most exciting technical project was managing the data analysis software for the Energetic Gamma Ray Experiment Telescope (EGRET), an enriching experience that culminated in attending the launch of the Gamma Ray Observatory aboard the Space Shuttle Atlantis and then processing instrument telemetry data into beautiful sky maps of gamma ray emissions from space.

"My career has been very fulfilling because of my love of math, computers, and the remarkable people with whom I have worked. The research environment at NASA is very much like a university, where learning and new ideas are encouraged, and hard work is rewarded."

JACQUELINE LE MOIGNE

Computer Scientist
(NASA GSFC civil servant)

Jacqueline in front of her 'Technology Board' displaying the current technology activities of the NASA Goddard Software Engineering Division, at Goddard, April 2011.

Following career experiences ranging from analyzing biomedical imagery to designing new algorithms for autonomous land vehicles (ALV) that navigate roadways, Jacqueline Le Moigne came to NASA Goddard in 1990. Once at Goddard, she focused her research interests on applying Computer Vision to Earth and space science problems such as robotics for the "Flight Telerobotics Servicer," land use/land cover assessment, and intelligent data management, all while investigating high performance computing. Since her arrival at Goddard, the overall scientific objective of her work has been to help Earth and space scientists analyze quickly and efficiently large amounts of data. In particular, for the past 20 years she has focused her research on satellite image registration, i.e., obtaining very accurate alignments of remote sensing images taken at different times by the same or different sensors. Such accurate measurements have scientific, environmental, and political implications, for example when tracking changes of the Earth's surface over time. This research led to a book that was published in 2011.

Jacqueline is currently the Assistant Chief for Technology in the Software Engineering Division, where she leads the strategic vision for Software and Information Systems technology development. She is also heading a project called IMAGESEER, which stands for IMAGEs for Science, Education, Experimentation, and Research. The IMAGESEER project is aimed at creating a web-based image database that will be used for Image Processing education and research.

"All dreams can be achieved through determination; and applying my knowledge and my skills to NASA challenges is a dream and a great privilege!"

MACKENZIE LOWRANCE

Electrical Engineer
(Contractor with Orbital Sciences Corporation)

Mackenzie and colleagues preparing for the launch of her first rocket at the Poker Flat Research Range in Fairbanks, Alaska, January 2011.

Mackenzie Lowrance is thoroughly enjoying her first job out of college – launching rockets! In the NASA Sounding Rockets Program, suborbital rockets are used to propel experiments out of the atmosphere for a few minutes at a time. Often times these experiments are telescopes looking at the Sun, stars, or distant galaxies. Others are plasma physics experiments with X-rays and various detectors. Mackenzie's job is to design the support for these experiments. She gets to design the power systems for the experiment and data transmission, as well as igniter systems for the rocket motors, parachutes, and deployable doors and booms. After the design, she builds and then tests the systems all the way through launch.

"There's nothing quite as exhilarating as watching months of hard work and careful planning leave the Earth at Mach 6."

MAUREEN MADDEN

Systems Engineer
(NASA GSFC civil servant)

Photo by Debora McCallum

Maureen showing a colleague where the ground stations are located around the globe, March 2011.

In 2010, Maureen Madden used her big picture thinking to help in the development of three new ground segments. One will replace the Space Network ground system with new hardware and software systems; the second is the GOES-R ground system; and the third is the Joint Polar Satellite System (JPSS) ground system. Maureen is working with many software engineers, communication engineers, and operation engineers to ensure that the data collected in space are captured on the ground and distributed to the scientists who analyze the climate changes and make weather predictions for future generations.

In her 20 years at NASA, Maureen has built instruments to study charged particles coming from the Sun and telescopes to study our Earth by analyzing the thickness and density of the polar ice sheets. Maureen has managed the operations of six Small Explorer spacecraft – SWAS, WIRE, SAMPEX, TRACE, FAST and RHESSI – one student-led spacecraft, CHIPS, and one midsized spacecraft, THEMIS. Maureen has also been successful in winning two new missions for Goddard, EPOXI and Astro-H.

"The opportunities at NASA are as diverse as the population. You can focus on one scientific discovery and win a Nobel prize, or you can be a systems engineer and put all the pieces together. The great thing about NASA is that there is always something new and exciting to work on."

KATHY MALNICK

Senior Systems Engineer
(Contractor with the West Virginia High Technology Consortium Foundation)

In the last year, Kathy Malnick has stood under a Space Shuttle at Kennedy Space Center and has witnessed a rocket engine test and climbed atop an engine test stand at Stennis Space Center. Kathy started her career writing software for distributed control systems for the food, oil, medical, and chemical industries. After 15 years, she returned home to West Virginia. Computer science jobs weren't plentiful when she finished college, but with several software companies, the FBI, and NASA in the neighborhood, Kathy is now able to pursue her career near her family.

Kathy has worked in software security, making sure that software installed in government applications protects the data it processes and stores. She has also worked on software process improvement, technology transfer for the Department of Defense, and electronic crimes, for the latter helping state and local law enforcement fight crimes involving computers, cell phones, and other types of technology.

Now Kathy works for NASA. Working out of the Goddard-managed IV&V Facility in Fairmont, West Virginia, Kathy is using her software background, desire to help people do their job better, love of writing, and focus on detail to increase the likelihood of mission success. She currently works with NASA's Office of Safety and Mission Assurance, the Japan Aerospace Exploration Agency (JAXA), and the European Space Agency (ESA) to identify common assurance practices across the agencies. She is also helping to create a Web-based handbook for NASA personnel who write software, following NASA software engineering requirements.

Kathy standing under the Space Shuttle Endeavor in the Orbital Processing Facility at Kennedy Space Center, April 2010.

"Being a small town girl, I love to travel. I truly enjoy visiting my customers around the country. I hope my current work with NASA will eventually allow me to visit all ten NASA Centers and experience in a small way the exciting work being done by talented people across the Agency. I never dreamed that someday I would be working for NASA and helping ensure the safety and success of NASA missions."

NANCY MAYNARD

Ecologist
(NASA GSFC civil servant)

Nancy (on right) with reindeer herder Inger Marie Eira Gaup, in front of her herd in Kautokeino, Norway, January 2009. Inger is a Ph.D. candidate at The University of Tromso and a research collaborator of Nancy's, together studying the influence of snow type on reindeer feeding on lichens under the snow.

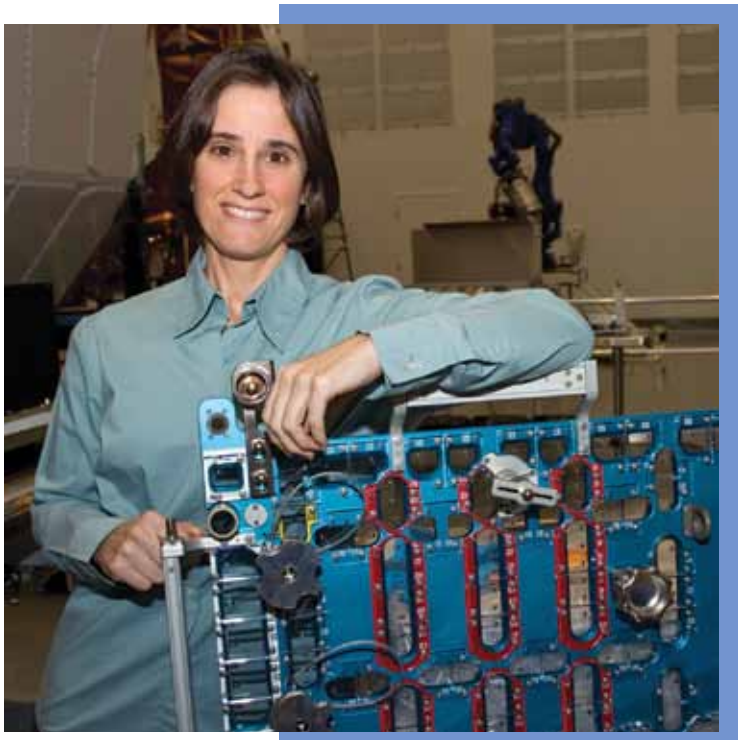
Nancy Maynard is a senior research scientist at Goddard with an interest in the use of remote sensing to observe changes in the Arctic environment, climate, and land use/cover and their impacts on indigenous Arctic populations. She is a collaborator on an International Polar Year project on Reindeer Pastoralism in a Changing Climate, an international, interdisciplinary collaboration with indigenous peoples of Scandinavia and Siberia. This effort is aimed at improving the resilience and adaptation of Northern Eurasian indigenous reindeer herders to the impacts of climate and oil and gas development on migration routes and pastures. Nancy is also Project Manager for NASA's Tribal Colleges & Universities Project, a science and technology educational mentoring program to increase the participation of tribal college students in the NASA family.

Nancy was originally trained as a marine biologist and has worked in a variety of fields that range from remote sensing studies of ice edge biota to hands-on oceanographic research at sea, to science policy in the White House Office of Science and Technology Policy (OSTP), to oil spill response, to management of large interdisciplinary science programs at NASA Headquarters, to remote sensing and health. She is also presently a Lead Author for the Polar Regions Chapter of the 5th Intergovernmental Panel on Climate Change (IPCC) Working Group II (on Impacts, Adaptation, and Vulnerability).

"NASA's technologies offer so many unique ways of addressing important societal issues – such as direct observations of changes in climate, environment, land cover or its uses – that can in turn be translated into improved decision and policy-making for a better world. I started with oceanography from space and am now working climate issues with Native tribes in the U.S. and indigenous reindeer herders in the Arctic. The opportunities are without bounds..."

LISA MAZZUCA

Astrophysicist
(NASA GSFC civil servant)



Lisa holding the Space Telescope Imaging Spectrograph (STIS) capture plate that the astronauts used during Servicing Mission 4 to remove the 111 screws of the instrument's Main Electronics Board cover plate, September 2010.

Lisa Mazzuca has been a NASA employee for 20 years. After receiving an undergraduate degree in mathematics, she began her career as a software engineer developing and coding mathematical specifications related to spacecraft orbit and attitude control. While a member of the Flight Dynamics Division at Goddard, she received a master's degree in astrophysics from Johns Hopkins University, as part of the NASA Part-time Study Program.

Lisa joined the Hubble Space Telescope (HST) Operations team in 1998 as the Space Telescope Science Institute liaison and later became the HST operations instruments manager. She accepted the position of Operations Integration and Test Manager for the Servicing Mission 4 Program in 2005, guiding the operations ground test program for the instruments as well as the communications to HST via the Space Shuttle Atlantis. She led the successful completion of the large-scale Servicing Mission Ground Testing program, as well as the HST communications and interface testing with Atlantis. Currently she is one of two instrument managers and on-call Mission Operations Managers for HST.

In 2006, Lisa received a doctorate in astronomy from the University of Maryland. Her scientific focus is in optical spectroscopy and imaging of the nuclear regions of galaxies, including circumnuclear rings and starbursts. Having degrees in mathematics, physics, and astronomy has allowed Lisa to take full advantage of the diverse opportunities at NASA.

"I have found NASA to be a great place to work since it has allowed me to build my education, travel internationally, and move around different engineering and scientific disciplines while maintaining a balanced personal life. Working hard in school allowed my dreams to come to fruition. The courses weren't easy and sometimes the path was very challenging, but the key is having a positive attitude and success-oriented mentality. The hard work pays off."

CHELSEA MCDONALD

Manufacturing & Process Engineer
(Contractor with Northrop Grumman Space Technology & Services)

Photo by Renee Spires

Chelsea at work at Northrop Grumman, Lanham, Maryland, March 2011.

Chelsea McDonald is a highly motivated, emerging talent at NASA. She began her career at NASA before she graduated from college, as a Manufacturing Engineer Intern developing manufacturing assembly processes specific to rocket engine technology for a private vendor on the ARES/ORION Roll Control System. In the final year of her undergraduate work, she was accepted to the NASA Undergraduate Student Research Program, where she optimized the infrared sensor layout design and developed logic diagrams for the Obstacle Avoidance System software supporting the laser ranging and Autonomous Robotic Navigation Project. She also assisted in the analysis, design, and fabrication of the composite bulkhead for the InFOCus High Altitude Balloon Telescope.

Upon graduation, Chelsea accepted a position where she applied her flair for developing unique and innovative manufacturing solutions. With her certification and experience in surface mount technology using state-of-the-art autoplacement equipment, she worked as the first woman lead manufacturing engineer involved in the fabrication of the electronic card assemblies of the Power and Data Handling avionics for high-profile, national asset work that included the James Webb Space Telescope and the Global Precipitation Measurement Programs.

In her leisure time, Chelsea enjoys the outdoors through fishing, rock climbing, and backpacking; and she is also an accomplished ballroom dancer. She truly exemplifies the spirit of woman engineers working for NASA.

"Set your sights high, do your best and never look back. With this approach to your life, you can change the world."

JAN MCGARRY

Applied Mathematician
(NASA GSFC civil servant)

Photo by Jay Friedlander

Jan at the keyboard, modifying the real-time software at NASA's Next Generation Satellite Laser Ranging System, April 2011.

Jan McGarry and her colleagues are building the Next Generation Satellite Laser Ranging System for NASA. Satellite Laser Ranging (SLR) is a Space Geodetic technique that very precisely measures the distance to a satellite. The satellite can be orbiting the Earth, the Moon, or a planet, or it can be in cruise to another planet. Used until recently only for two-way ranging to Earth-orbiting satellites, recent work by Jan and others has demonstrated a form of this technique called asynchronous planetary transponder ranging to the Mars Orbiter Laser Altimeter (MOLA) orbiting Mars onboard the Mars Global Surveyor satellite, to the Mercury Laser Altimeter onboard the MESSENGER spacecraft to Mercury, and most recently to the Lunar Orbiter Laser Altimeter (LOLA) onboard the Lunar Reconnaissance Orbiter (LRO) while orbiting the Moon. In addition, the ground segment part of one-way laser ranging to LRO was developed by Jan with colleague Tom Zagwodzki in 2008, and the system has been operational since June 2009, providing important ranging data to the LOLA Science Team.

Jan is an applied mathematician in the Solar System Exploration Division and has been a part of Satellite Laser Ranging her entire career. Jan manages the research and development for the Next Generation Satellite Laser Ranging System, does all the algorithm development for this effort, and writes real-time software to implement these algorithms. Jan is also the Receiver Algorithm subsystem lead for an instrument on the Ice, Clouds, and Land Elevation Satellite 2 (ICESat 2) and is a member of the International Laser Ranging Service Governing Board.

"No one ever entered the field of Satellite Laser Ranging for fame or fortune. Rather we are in this field because we love the work, believe in the importance of the science that comes from this work, and find a great comradeship in the global laser ranging community. This is worth far more than money and why most of us stay in this field for our entire careers."

LEVA MCINTIRE

Optical Engineer
(Contractor with Catholic University of America)

Leva posing beside the shelf she helped build for airplane testing of an imaging laser altimeter, April 2011.

Leva McIntire started at NASA Goddard as an intern with the Lunar Orbiter Laser Altimeter Science and Operations Center in 2009 and helped set up the calibration system at the Goddard Geophysical and Astronomical Observatory with the Laser Ranging Team. She continued working at NASA the next summer, 2010, helping to determine the crystal sizes at cryogenic temperatures of a molecule called Alpha-D Trehalose to determine with Dr. Gunther Kletetchka if the molecule would be suitable for space medicine and preservation of transplant organs. That summer she won the John Mather Nobel Scholar Award for excellence in her work as an intern.

After graduating from Seattle Pacific University in December 2010 with a Bachelor of Science degree in physics, Leva is now back at Goddard, working closely with the Laser and Remote Sensing Group. Her projects include work on trace gas detection instrumentation, laser communications, and the building of flight racks for airplane tests of these instruments.

This fall, Leva will be attending The University of Rochester's Hajim School of Engineering and Applied Sciences, The Institute of Optics, to begin work on a Ph.D. in optics. She hopes to return to Goddard again someday to help explore the universe with her passion for lasers.

"I always wanted to do something amazing with my life. NASA has given me the opportunity to reach for the stars and to understand how mind - blowing the world really is, and it has given me an outlet to make the world a better place in my own way."

JAYLEE M. MEAD

Astronomer
(NASA GSFC civil servant, retired)

Jaylee behind the podium at a Friday afternoon Scientific Colloquium at Goddard, May 1992.

In 1959, Jaylee Mead became one of the first professional women to be hired by NASA. During her 33-year tenure at Goddard, she served as mathematician, staff astronomer, and Assistant Chief of the Laboratory for Astronomy & Solar Physics. Long before computers became a part of everyday life, she established the Goddard Astronomical Data Center (ADC), a computerized data bank of stars and galaxies to aid astronomers in determining whether the objects they were viewing from space missions had already been identified, or were being discovered for the first time. This initiative required collaboration with the U.S. Naval Observatory, Yale Observatory, and the Naval Research Laboratory. Once the ADC was up and running, Jaylee travelled to many parts of the world to give talks to other astronomers about its creation and applications.

In the early years of Goddard, management encouraged employees to network through clubs, and Jaylee participated with vigor. Jaylee's favorite was the Music and Drama (MAD) club, whose members produced Broadway-type shows in the Goddard Recreation Center. Some of her favorite roles were Nellie in *South Pacific*, Vera in *Mame*, and Golde in *Fiddler on the Roof*. Jaylee is pleased that MAD is still going strong after all these years.

Among the many lasting contributions that Jaylee made to Goddard was the establishment of the Friday afternoon Scientific Colloquium Series, which she founded in the mid-1960s and chaired until her retirement. Jaylee retired from NASA in 1992, as Associate Chief of the Space Data & Computing Division.

"The opportunity to provide data to other astronomers and to lighten their work load was rewarding. I also enjoyed interacting with many colleagues to build worldwide access to and input for the Goddard ADC."

MEGAN MEEHAN

Systems Engineer
(Contractor with Orbital Sciences Corporation)

Meg outside her office in Greenbelt, Maryland, beside a poster for the Hubble servicing missions, April 2011. Megan is proud of her support for the fifth and final servicing mission.

Growing up in the small town of Moonachie, New Jersey, Megan Meehan always had an interest in engineering. After a fateful seventh grade field trip to the Buehler Challenger and Science Center, she decided right then and there to become an aerospace engineer and dreamed of getting the opportunity to work in Mission Control. After graduating from the University of Maryland, Meg was offered a full-time position with Orbital Sciences Corporation Technical Service Division. She worked to support the fifth and final Hubble Servicing Mission (STS-125) as a mechanical systems engineer for the Orbital Replacement Unit Carrier. Meg was responsible for ensuring the fit, form, and function of roughly a third of the Atlantis payload for the flight, and she was also given the opportunity to work in Mission Control as a payload support engineer for the duration of the mission, thereby living out her lifelong dream.

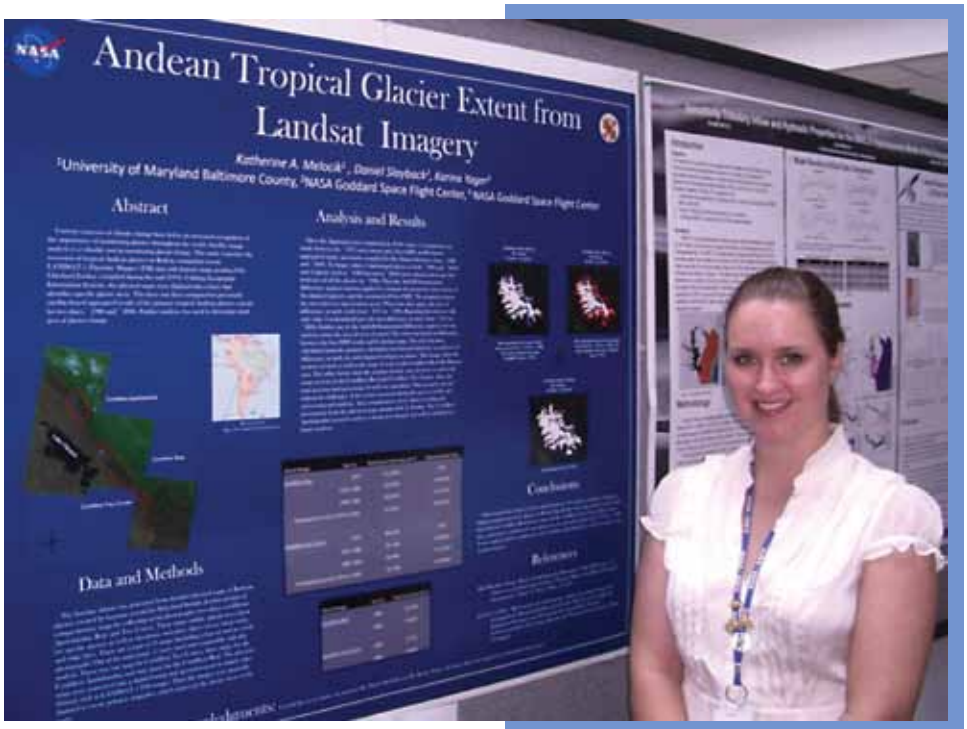
Today Meg works as a systems engineer responsible for developing the Detector Array Assembly design requirements for the laser altimeter on the Ice, Clouds, and land Elevation Satellite 2 (ICESat 2). She is an initiated brother of Alpha Phi Omega National Service Fraternity, logging over 500 hours of community service over the course of her college career. Active with the Challenger Center for Space Science Education, Meg's volunteering has ranged from a space camp counselor to giving talks on her professional and academic experiences. In her spare time, Meg enjoys traveling with her fiancé, cooking, running, and following college sports.

"Failure isn't a setback—it's just another type of opportunity."

KATHERINE A. MELOCIK

Environmental Scientist
(Contractor with Science Systems and Applications, Inc.)

It's no surprise that Katherine Melocik wanted to be an inspiring scientist in climate and environmental sciences. Growing up, she was always fascinated with geological and ecological events. Now she is a recent graduate with undergraduate degrees in Political Science and Environmental Science from the University of Maryland Baltimore County (UMBC). During her undergraduate career, she interned for a U.S. Senator, the NASA Jet Propulsion Laboratory (JPL), and NASA Goddard as well as studied environmental conservation in the Brazilian Amazon with Kayapo Indians. However, she craved more, and so she began working as a research assistant at Goddard, where she enjoys using her Geographic Information System (GIS) and remote sensing knowledge to understand the world around her.



Katherine beside her poster on tropical glaciers, at a poster session at Goddard, July 2010.

At NASA JPL Katherine worked for six months on historical Arctic sea ice thickness measurements and their variation over time. Now at Goddard she is involved in many fascinating projects, including the study of Andean glacier recession and work on producing and visualizing new satellite orbits. Working at Goddard, she has the opportunity to use satellite imagery to study climatic changes as well as land disturbances.

"I still can't believe that I'm doing what I love. It is especially rewarding that I get to work with some of the top scientists in the world. I enjoy working on my assignments and projects, which involve my favorite subject – Earth. There is always something new, challenging and exciting happening here at NASA."

NARGESS MEMARSADEGHI

Computer Engineer
(NASA GSFC civil servant)

Nargess in her office at Goddard, April 2011.

Nargess Memarsadeghi has been working at NASA Goddard as a Computer Engineer since July 2001. She works in the Science Data Processing Branch on design and development of algorithms for processing large scientific data sets, with applications in remote sensing, computational optics, and astrophysics. In particular, her past work includes design and development of efficient clustering, interpolation and image fusion algorithms, and hyper-spectral and Synthetic Aperture Radar (SAR) data processing algorithms, all with applications in remote sensing. She has also worked on developing particle characterization algorithms for the Particle Image Velocimeter (PIV) project, which has applications in planetary sciences, and has performed extensive stability measurements of the MicroShutters Subsystem of one of the instruments of the James Webb Space Telescope, by applying an automated image registration algorithm. More recently, Nargess has worked on interferometry algorithms for the Wide-Field Imaging Interferometry Testbed (WIIT) project and the Non-Redundant Aperture problem. Nargess is also interested in educational and outreach activities at Goddard. She currently works on design and development of NASA scientific and computational case studies for computer science and applied mathematics university students, and she serves on the committee of the Information Science and Technology (IS&T) colloquium series.

"Science data processing is of great importance at different stages of a mission's lifecycle. During the research and development phase, various scientific scenarios can be simulated, and algorithms for better understanding them can be examined before being integrated into an actual mission. Various (sub)systems and instruments can be evaluated by analyzing data of their performance during a mission's development and testing phases. Finally, no mission achieves its scientific goals without understanding, interpreting, and analyzing its datasets, often requiring image processing and machine learning algorithms. Computer scientists help NASA scientists achieve their missions' scientific goals of discovery and exploration."

PAMELA MILLAR

Applied Physicist
(NASA GSFC civil servant)

Pam Millar, a specialist in developing laser remote sensing instrumentation, started her career at Goddard fresh out of graduate school over twenty years ago. Her first project involved developing an active airborne target that enabled two-way laser ranging from a ground tracking station in order to understand the atmospheric effects on laser radiation over different types of land masses. Her biggest technical role was as the lead on a stellar reference system (SRS) on an Earth orbiting satellite that measured the changes in the elevation of the ice sheets over the north and south poles. The SRS instrument measured the pointing angle of the satellite's downward pointing laser to one arc-second; this is equivalent to the angle subtended by a resting dime over the length of a football field. This highly precise measurement aided scientists in determining where on the ground the laser elevation measurement took place. During the development of this space flight instrument, Pam also had two children.

Pam operating an active airborne target mounted on the belly of a T-39 aircraft, August 1992.

Chief of Goddard's Laser Remote Sensing Laboratory, Pam currently manages a group of scientists and engineers that develop laser instruments for both Earth and planetary applications such as the Mercury Laser Altimeter that recently entered into orbit around the planet Mercury. She also dedicates time to ensure that Goddard is one of the best places to work by serving on center committees and forums that address workplace issues. Further, in 2009 she was conference co-chair of the Women in Astronomy Conference (http://wia2009.gsfc.nasa.gov).

"Managing and leading a group of technical experts is similar to being the conductor of an orchestra, ensuring that everyone knows his or her part and knowing also when to step in. When it's done well, the impact is greater than anything a single person can accomplish. Being part of something so much bigger than yourself is incredibly rewarding; it's all about making a difference in the world."

SUSAN D. MORRISON

Construction Engineer
(Contractor with Parsons Infrastructure and Technology)

Photo by Debora McCallum

Susan inspecting a custom designed mechanical systems electrical control, April 2011.

Susan Morrison is a construction lead engineer helping to design and build laboratories at NASA Goddard. One of her principal accomplishments was in the Robotics Servicing Cleanroom. She gave direction to Kling Engineering to value engineer this project, removing $5 million (out of a $9.9 million project) from the overall design budget while still providing a cleanroom that met all the class and metrology needs. This project came in on time and on budget, meeting all the required performance criteria.

Susan's other duties include providing the government with exposure on new technologies, providing technical expertise to other construction engineers on the design and building of cleanrooms and laboratories, and providing technical information to Parsons' internal design engineers. Among the other activities in her 30+ years of cleanroom engineering experience, Susan also designed and built a cleanroom for the Japanese Atomic Energy Research Institute (JAERI), was the chair of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Handbook Committee for the Technical Committee 9.11 (TC911), developed and restored a severely damaged facility after the Cerro Grande Fire at Los Alamos, and constructed a facility for the International Atomic Energy Agency (IAEA) in Vienna, Austria.

"One must love his or her work but not necessarily the job. Remember your work is what you do; your job is whom you do it for. If you love your work, embrace it as a profession not a job, and you will always be successful."

AIMEE NEELEY

Biological Oceanographer
(Contractor with Science Systems and Applications, Inc.)

Photo by Juan Botella

Aimee taking a seawater sample from the Conductivity-Temperature-Depth (CTD) rosette on the ship Nathaniel B. Palmer in the Southern Ocean, March 2011.

Aimee Neeley grew up in a small town 77 miles north of Pittsburgh, Pennsylvania. After high school, she attended the College of Charleston in South Carolina, earning both a bachelor's and a master's degree in Marine Biology. For her master's thesis she focused on protein regulation in the red tide dinoflagellate *Karenia brevis*, at both the transcriptional (RNA) and translational (protein) level, in response to iron availability. After graduation Aimee worked at the College of Charleston for two years. In 2007 she accepted a position at the Bermuda Institute of Ocean Sciences. There she participated in monthly cruises as part of a study to monitor the production and consumption of biogenic sulfur in the Sargasso Sea.

One of the most rewarding aspects of Aimee's work has been the opportunity to participate in fieldwork, particularly on research cruises. Traveling to Antarctica as a graduate student was one of the most amazing experiences of her life, and she has pursued the participation in research cruises ever since.

Aimee is currently a member of Goddard's Ocean Ecology Branch. Her team is responsible for ground-truthing data products from the ocean color satellites through the collection of biogeochemical samples and optical profiles during field campaigns.

"Participation in field campaigns is appealing and very satisfying because I am collecting samples in the real world. Ground-truthing is vital to our understanding of what is really going on."

CAREY NOLL

Computer Scientist
(NASA GSFC civil servant)

Photo by Mark Emmons

Carey in front of NASA's Next Generation Satellite Laser Ranging System, at the Goddard Geophysical and Astronomical Observatory in Greenbelt, Maryland, March 2011.

Carey Noll majored in mathematics in college but came to love the logic and challenge of computer programming. She began her career at NASA Goddard in 1981 as a programmer and is now managing an internationally recognized data system, the Crustal Dynamics Data Information System (CDDIS) in Goddard's Solar System Exploration Division. The CDDIS provides support for studying long term, systematic measurements of the Earth system by making space geodesy data, derived products, and supporting information available to science researchers around the world. Space geodesy is the use of precise measurements between objects in space (like orbiting satellites and distant quasars) to determine positions of points on the Earth in order to study the Earth's size and shape, its rotation, and its gravity field. Throughout her career at NASA, Carey has used database management, applications programming, web development, and metadata and formatting standards to create and run a data system used by not only geodesists but scientists performing research in solid Earth studies, sea level monitoring, geohazard impacts, and ocean, atmospheric, and hydrological science.

"I always knew I wanted to work in the computer field, which came from a love of mathematics in high school and college. I am so lucky to work at a great place like NASA and do rewarding and challenging work that helps scientists around the world conduct important research in our Earth systems."

MARIA NOWAK

Alignment, Integration and Test Engineer
(NASA GSFC civil servant)

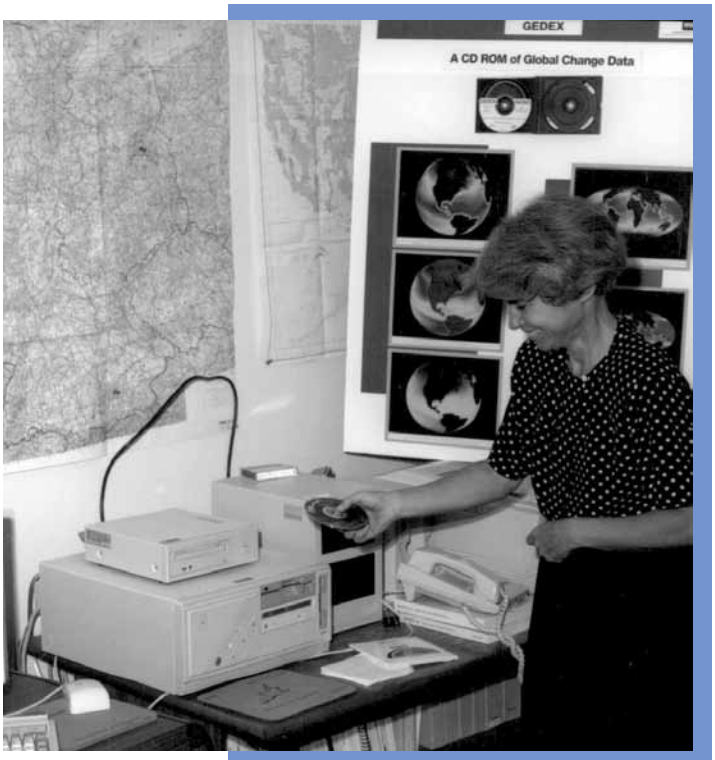
Maria aligning the optics for the GeoSpec breadboard using a cathetometer, an alignment telescope mounted on two orthogonal axes, in an Integration and Test complex at Goddard, February 2006.

Maria Nowak has been at NASA Goddard since 2001 and is an Alignment, Integration and Test (AI&T) engineer in the Optics Branch. Maria has a bachelor's degree in Physics from San Diego State University and a master's degree in Physics from the Johns Hopkins University Whiting School of Engineering. As an AI&T engineer, Maria's work includes developing alignment plans, performing metrology, and analyzing data, as well as leading and mentoring other engineers. She has supported various sounding rocket projects at Goddard and most recently served a principal role in the metrology of the James Webb Space Telescope Integrated Science Instrument Module (ISIM). Most notably, she was instrumental in the development of a cryogenic Photogrammetry system that is the first of its kind to operate down to a temperature of 30 Kelvin and is used to measure warm to cold deformations in the ISIM structure. In 2011, Maria decided she was ready for new challenges and joined the Optics Branch Management team as an Associate Branch Head.

"Before my daughter was born, I never stopped thinking about what I wanted to do when I grew up, and all the things that I wanted to be. After she was born, it became all about her; all I could think about was what I wanted for her, and I just sort of figured I was done. It's important to remember that no matter who you are or where you are in your life, you're never really done, and you should never stop trying to be the person you want to be. I'm finally beginning to realize that."

LOLA M. OLSEN

Project Manager
(NASA GSFC civil servant)



Lola enjoying the release of the GEDEX CD-ROM that she soon after presented at the International Space Year celebrations in Germany, 1992.

Within a few months of Lola Olsen's arrival at NASA Goddard in 1986, she was asked to travel to Madison, Wisconsin, and take responsibility for identifying and archiving "ground-truth" data being collected to validate the data products of the International Satellite Cloud Climatology Project (ISCCP). Through NASA's Climate Data System, her role was to assure that data collections were maintained and subsequently offered for validation of both the cirrus clouds in Wisconsin and later marine stratocumulus clouds off the coast of California, in June 1987. Lola later also took responsibility for one of NASA's contributions to the 1992 International Space Year by organizing data for the Greenhouse Effect Detection Experiment (GEDEX) CD-ROM.

Lola now serves as Project Manager for NASA's Global Change Master Directory. Several of her employees were former students from her Remote Sensing classes at the University of Maryland. The Data and Services, and more recently the Climate Diagnostics, directories have become quite popular globally, and combine to serve as one of NASA's primary contributions to the Committee on Earth Observation Satellites, as the International Directory Network, or IDN.

Outside of work, with two days to prepare, Lola was invited to co-pilot a multiengine Beech Travel-Air north of the Arctic Circle to Tutoyaktuk in the Northwest Territory. The journey and the time spent investigating the landscape have ever since remained a treasured memory. Lola has also been an avid swimmer and diver all her life, and has shared her love of the water with her two children.

"My life has been filled with opportunities and ongoing challenges at NASA, beyond my expectations. Each day I anticipate learning something new and subsequently sharing the thrill of discovery (and life) with colleagues and family."

PEGGY E. O'NEILL

Earth Scientist
(NASA GSFC civil servant)

Photo by Michael Cosh

Peggy (on right) and her experiment team during a field campaign at the Goddard Geophysical and Astronomical Observatory four miles from Goddard's main Greenbelt facility, August 2009. The team is using a ground-based simulator of the SMAP L-band radiometer and radar instruments.

Throughout her career at NASA, Peggy O'Neill has spent considerable time conducting field experiments to develop the basic understanding of how to measure surface soil moisture from space using microwave sensors. These experiments are a little more complicated than simply "digging dirt," as her friends often tease. Soil moisture information is important because conditions at the Earth's surface (the thin interface between the land and the atmosphere) have a strong effect on weather and climate, floods and droughts, agriculture, and human health. Partnering with national and international colleagues, Peggy has participated in field campaigns from Oklahoma to Idaho and from Canada to Europe and Australia to assess the problems associated with soil moisture estimation in diverse climates and land covers. The soil moisture retrieval algorithms developed from these experiments have led directly to NASA's Soil Moisture Active Passive (SMAP) mission, the first in a series of missions that NASA will fly in response to an Earth Science Decadal Survey conducted by the National Research Council. SMAP is scheduled to launch in late 2014 or early 2015, and Peggy sees her current role as SMAP Deputy Project Scientist as a rewarding culmination to an exciting NASA career.

"When I was in college and one of my professors asked me to go out into the field and take some soil moisture samples for a new project, I never dreamt that many years later I would be helping to lead NASA's first soil moisture mission in space. The chance to work on something from original idea through proof-of-concept to an eventual mission in space is a very unique and exciting opportunity that only NASA can provide."

MELANIE N. OTT

Opto-Electronics Engineer
(NASA GSFC civil servant)

Melanie at her desk computer at Goddard, working on the Lunar Reconnaissance Orbiter hardware development, April 2008.

Melanie N. Ott is the Engineering Group Leader of the Photonics Group and Laboratories in the Parts, Packaging and Assembly Technologies Office at NASA Goddard. She is a world's expert in the field of optical fiber hardware for space flight environments. For the past 20 years, Melanie has provided leadership on a variety of NASA programs for design, development, manufacturing, and implementation of fiber optic and optoelectronics for space instrumentation. She has published over 80 papers and presentations on the subject of photonics for space flight and is an invited speaker around the world.

The Photonics Group facility, which provides a full service for building optical hardware for space flight science and engineering missions, was developed by Melanie over the past 17 years. Melanie was the lead hardware engineer for fiber optics on several programs, including the Laser Ranging Mission on the Lunar Reconnaissance Orbiter (LRO), the Lunar Orbiter Laser Altimeter (LOLA) Instrument on LRO, and the Mercury Laser Altimeter on MESSENGER; and she provided optical fiber system hardware for the Express Logistics Carrier on the International Space Station and the Mars Science Lab ChemCam.

Melanie holds bachelor and master degrees in Electrical Engineering with an optics emphasis and worked as a graduate researcher at NASA Langley Research Center before coming to Goddard. She became a NASA civil servant in 2005, after working for over ten years as a Goddard contractor.

"To any potential engineers, I would offer this advice: Whatever you envision as an invention, a business venture, or simply a possibility (however unlikely), continue to visualize it. Do not give up even if others don't agree at best, or ridicule you at worst. It may take a great deal of tenacity and time, but in the end your vision will be real and you will have changed the world. You have the power to do that, so why not?"

CLAIRE L. PARKINSON

Climatologist
(NASA GSFC civil servant)

Claire Parkinson uses satellite data to study sea ice in the Arctic and Antarctic regions and is also the Project Scientist for a major Earth-observing satellite mission named Aqua. She and her colleagues have used satellite data to calculate changes in the polar ice covers from the late 1970s to the present. Their findings of significant decreases in Arctic sea ice and lesser overall increases in Antarctic sea ice have been important contributions to the understanding of recent climate change.

As Aqua Project Scientist, Claire is a prime coordinator for a mission that is obtaining data about the Earth's atmosphere, oceans, land, and ice. These data are being used by hundreds of scientists from around the world for research purposes and also by others for such practical purposes as weather forecasting and deployment of fire fighters.

During her 33 years at NASA Goddard, Claire has additionally written four books and co-written or co-edited eight others, on topics including sea ice, satellite observations, climate modeling, climate change, and the history of science. She speaks frequently to student and teacher groups, trying to relay the excitement and value of science and to bring balance to the polarized discussion of climate change. She has served on the Council of the American Association for the Advancement of Science (AAAS) and is honored to be a member of the National Academy of Engineering and the American Philosophical Society, the latter founded by Benjamin Franklin.

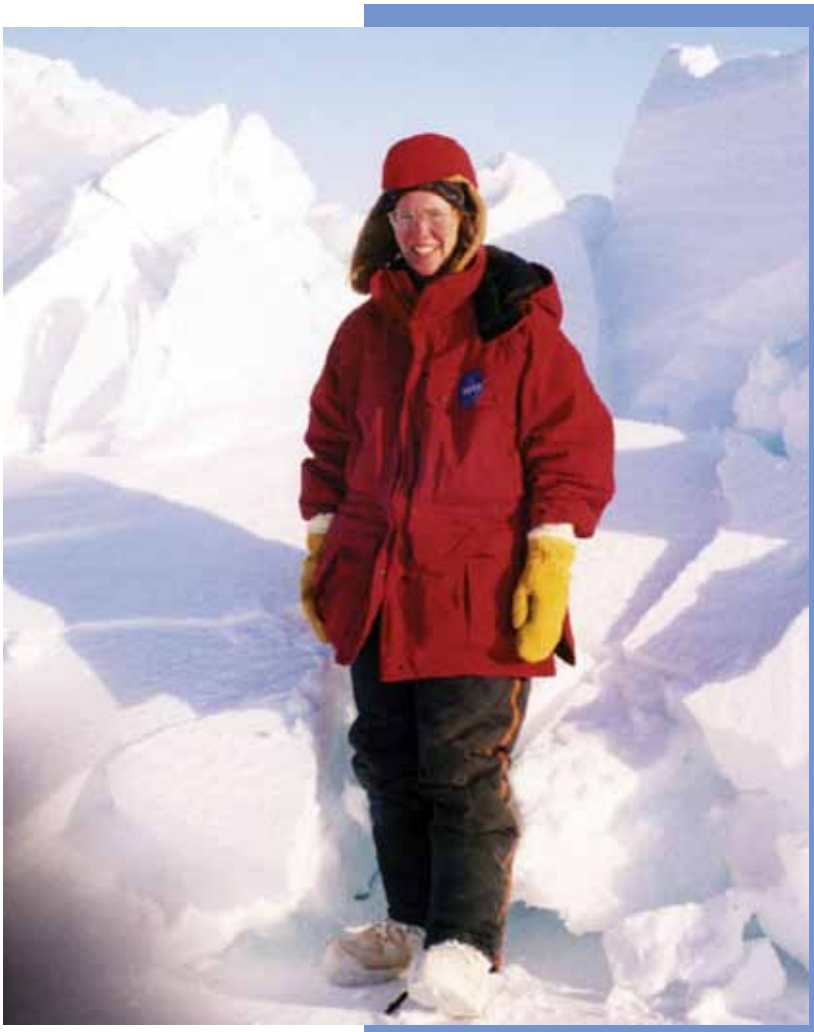


Photo by Elizabeth Arnold

Claire standing next to a ridge of ice in the central Arctic, on a NASA expedition to the North Pole, April 1999.

"It is such a privilege to work at NASA and to be a contributor to a mission that is helping humanity in many ways, and such a privilege also to engage in field work in the Arctic and Antarctic, to use state-of-the-art computer equipment, and to get paid for engaging in scientific discovery."

LORI PERKINS

Scientific Visualizer
(NASA GSFC civil servant)

Lori giving a presentation in the Scientific Visualization Studio demonstration room at Goddard, to the Washington, D.C., Chapter of Women in Film and Video, July 2010.

Do you like art, math, and science? Perhaps a career in scientific visualization is for you! Lori Perkins is a computer engineer for NASA's Scientific Visualization Studio. She specializes in data visualization, where she uses complex two-dimensional (2D) graphics, three-dimensional (3D) animation, editing, and image analysis tools to better understand, illustrate, explain, and present technical ideas, concepts, and scientific results. Remote sensing information comes from many sources, like satellites, balloons, aircrafts, and computer simulations. Data visualizers like Lori combine different information collected from different sources to highlight the diverse work of NASA's scientific community.

Lori generates movies and images for NASA's scientists that are showcased in museums, scientific publications, scientific and non-scientific presentations, educational resources, websites, documentaries, news media, and commercial advertisements. She focuses on creating elegant and informative visualizations that accurately represent the underlying information. Her breadth of work includes visualizations of 68 different tropical cyclones, global fires, global temperature changes, global carbon dioxide, global ozone, world droughts, crop intensity, food insecurity, ebb and flows of sea ice, flyovers of Antarctica, elevation changes in Greenland, dust storms in Africa, land-use changes in China, the collision of the Shoemaker-Levy comet with Jupiter, the Earth's biosphere, invasive species, flight paths, volcanic eruptions, rainfall, wind patterns, sea surface temperatures, and more.

"NASA has so many amazing scientists and engineers developing groundbreaking research. It is a privilege to play a small part in this team and to see my work displayed in so many unique locations."

WANDA PETERS

Aerospace Engineer
(NASA GSFC civil servant)

Wanda during an interview at Goddard for the Women @ NASA website, January 2011.

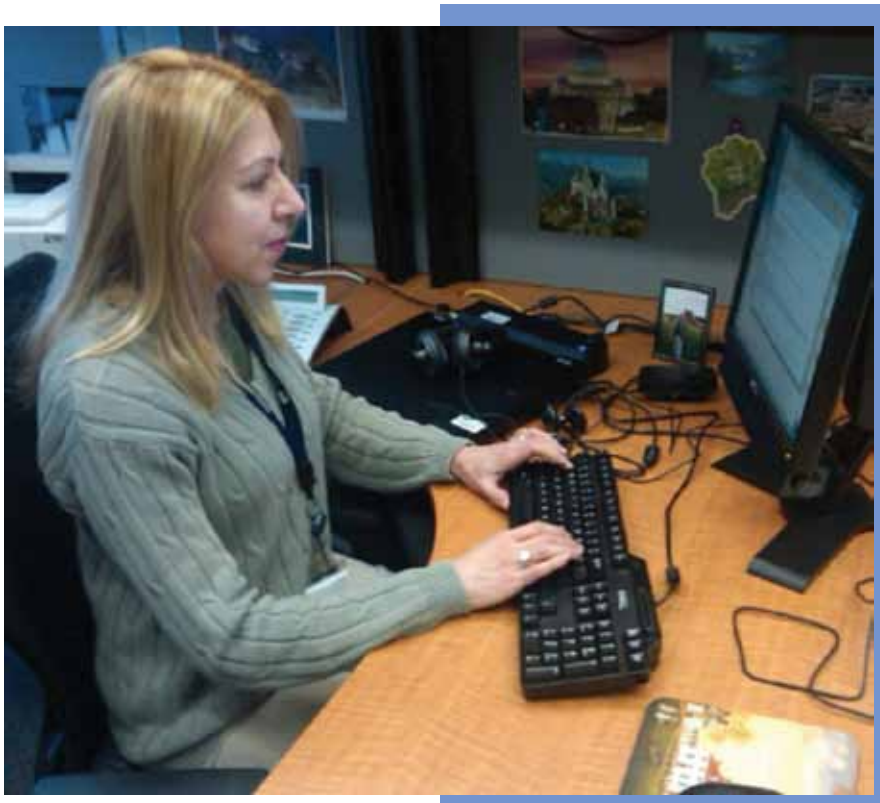
Very early in her NASA journey, Wanda Peters remembers going on her very first trip as an aerospace engineer. NASA had just completed the first servicing mission for the Hubble Space Telescope (HST). The HST returned flight hardware needed characterization. Wanda traveled to NASA's Jet Propulsion Laboratory in California to take measurements on the returned Wide Field Camera-I radiator. Wanda could not believe she was actually touching flight hardware that had just returned from space. To Wanda, working at NASA is awesome. One of her most memorable experiences was walking around the Shuttle on the launch pad at Kennedy Space Center.

Wanda began her NASA journey on January 3, 1990. Her current position is Assistant Division Chief in the Mechanical Systems Division, responsible for managerial and technical oversight, contract technical evaluation, safety, and facility management. Prior to her current position, Wanda was the Coatings Engineering Group Lead in the Contamination and Coatings Engineering Branch, responsible for overseeing the selection, application, characterization, and qualification of thermal control coating. She is recognized as an authority in the area of aerospace thermal control coatings. She is extremely proud of her contribution as the Principal Investigator for the Lotus Dust Mitigation Coating that is designed to reduce the accumulation of dust. Wanda has supported over 25 NASA missions and has over 15 publications.

"I believe one of the greatest gifts you can bestow on someone is being a positive influence, motivation, or support system for them. It is my personal goal to make a positive difference in all the lives I have the privilege to touch. Our children are our future, and if we don't invest in our children we can't expect to have much of a future."

SUSANNA PETRO

Physicist
(NASA GSFC civil servant)



Susanna working at her desk at Goddard, March 2011.

Susanna Petro has more than 25 years of experience in spacecraft and instrument systems design, test, and launch. She is currently working as a Systems Review Manager chairing the Lunar Atmospheric Dust Environment Experiment (LADEE) and the Mars Atmosphere and Volatile Evolution (MAVEN) missions' Integrated Independent Reviews Team. At Goddard, she previously supported the GOES-R satellite instruments. Prior to that, she was at the NASA Johnson Space Center in the Advanced Space Propulsion Laboratory and with the Electromagnetic Interference/Compatibility Test & Analysis Group. Earlier, before moving to the United States, she worked at Thales Alenia Space in Europe in the development of spacecraft and payloads for science and exploration (the Cassini-Huygens and Mars Express missions) and for remote sensing of the Earth (the ERS-2, Envisat, and COSMO-SkyMed missions). In addition to carrying out space research activities with advanced particle detectors and Earth remote sensing, she coordinated collaborations with the European Space Agency and the Italian Space Agency. She used to teach Experimental Nuclear and Particle Physics at the University of Rome, Italy. Her hobbies are skiing, hiking, and swimming.

"I have two passions in my life: physics and nature in all its manifestations. Working at Goddard is not only a big honor, but it also allows me to apply physics while being immersed in a wonderful natural environment."

BARBARA PFARR

Program Systems Engineer
(NASA GSFC civil servant)

Photo by Maria So

Barbara giving a presentation in Singapore on collaborative systems thinking, July 2009.

As a Program Systems Engineer, Barbara Pfarr's job is to ensure that the integrated performance of all the technical elements of a program is sufficient to achieve the program science goals and objectives. She is responsible for all engineering activities that are broader in scope than the needs of the individual project and for technical oversight and coordination amongst various program elements. This becomes a very large job when it's a big program, with missions in formulation, development, and operations, as it is in her current position as Program Systems Engineer for the entire Earth Systematic Missions Program. The job requires big-picture thinking and the ability to keep track of many issues simultaneously. To perform this job, Barbara leads a team of systems engineers from several NASA centers. This team provides insight and support to the program's missions, performs cross cutting studies, and ensures consistency in program processes and products.

"NASA programs are big, complex organizations full of highly talented scientists and engineers. Ensuring that those scientists and engineers are all working together, communicating with each other, understanding each other, and working towards common goals, is the critical role performed by the systems engineer."

JEANNETTE PLANTE

Quality Standards Program Manager
(NASA GSFC civil servant)

Jeannette Plante uses test data, key characteristics of raw parts and materials, controlled conditions of times and temperatures, and mechanical and visual inspections to find the best ways to build highly reliable electronic boards for NASA's and NOAA's satellites. In partnership with reliability engineers, materials engineers, manufacturing technicians, and quality engineers, she has been able to identify ways to avoid manufacturing defects that cause cost overruns and schedule delays or can lead to mission failure. Her research has included ways to prevent short circuits from contamination, ways to pick the most stable power supplies for the mission, and how to attach an electronic part to a board with over 1,000 pins without creating a defect.

Jeannette explaining NASA's methods for reducing defects in electronics hardware to an audience at NASA Glenn Research Center in Cleveland, Ohio, February 2011. The lecture was simulcast to the other NASA centers, NASA suppliers, and the European Space Agency.

Since 1987, Jeannette's job has included sharing information among NASA's ten field centers about defect reduction in electronic hardware. She is currently the technical lead for NASA Headquarters' Workmanship Standards Program, which sets the minimum quality standards for all electronic boards and cables made for NASA missions either by a NASA Center or by a NASA contractor. This role also has the responsibility for showing projects and engineers how to make good choices early in the design that make it easier to avoid defects that cannot easily be repaired. Jeannette also works with materials and part suppliers to provide NASA designers with parts and raw materials that are highly suited to NASA designs and are defect-free.

"It is really rewarding to work in an area where you can dedicate yourself to making what we do better and better. And because electronics technology evolves at lightning speed and NASA seeks to push the limits of system performance, there are many opportunities to discover a new technology's behaviors and the methods for taking advantage of those new behaviors."

CHANDA PRESCOD-WEINSTEIN

Physicist
(NASA Postdoctoral Fellow)

Photo by David Friedlander

Chanda in her office at Goddard, November 2010.

Chanda Prescod-Weinstein is a bit of an outlier in the Observational Cosmology Lab. A theoretical physicist by training, her primary area of expertise is the intersection of problems in observational and theoretical cosmology with the more fundamental question of quantum gravity. As a NASA Postdoctoral Program Fellow, Chanda is continuing her theoretical work while also embarking on new data-oriented adventures. Her current focus is on issues regarding the observation of weak gravitational lensing with upcoming space telescopes such as NASA's planned Wide-Field Infrared Survey Telescope (WFIRST). Because this is a weak effect (as opposed to the stunning images of strong gravitational lensing), statistics are needed from observations of many galaxies. We are only now entering an era when this kind of work, known as precision cosmology, is possible.

Weak lensing observations are particularly useful for studying the evolution of such large structures as galaxies and galaxy clusters. In turn, knowledge of such structures can be used to study what is arguably the biggest question in cosmology: the source of the mysterious cosmic acceleration. Understanding the cause of cosmic acceleration is a challenge that drives Chanda on a daily basis, both as a theorist and now as a member of the observational community.

"To become a cosmologist is an incredible dream. The only thing more incredible than dreaming it is living it, which is absolutely what I am doing right now. What could possibly be better than getting paid to figure out where everything comes from?"

DIANE PUGEL

Physicist
(NASA GSFC civil servant)

Photo by Chris Gunn

Diane conducting non-destructive evaluation tests using ultraviolet light on composite honeycomb material, 2009.

The wonder and appreciation that Diane Pugel has for science is why she does what she does. Back in middle school, she was convinced that she'd be a poet and writer and live in Greenwich Village. In high school, she came to appreciate that the same creative spirit exists in science. Diane's doctoral degree is in experimental physics, which means that she build things to test and explore the natural world. Science is a very creative place to be! Since she's been at NASA Goddard, Diane has developed and built sensitive detectors to explore the Earth, X-ray astrophysics, planetary atmospheres, the Sun, the Space Shuttle, and future spacecraft.

"Creativity knows no boundaries—when you have a good idea, it doesn't matter if you are a woman or man, old or young. Science is accessible to anyone—it is always around us!"

LORRAINE REMER

Physical Scientist

(NASA GSFC civil servant)

Lorraine downloading data from a remote sensing instrument that measures aerosol characteristics, in Veracruz, Mexico, March 2006.

Lorraine Remer uses information from satellites to investigate the role of airborne desert dust, smoke from fires, and urban pollution in the global climate system. Her highly successful MODIS aerosol product is one of the climate research community's most reliable data sets. Further, she has been involved in field campaigns including Smoke/Sulfates, Clouds and Radiation (SCAR) experiments. Her work periodically takes her away from the computer in her office to places like the Amazon Basin in Brazil, the Caribbean, and the desert transition zone in Israel.

Lorraine serves on national and international committees defining the future of climate observations from space and provides policymakers with information on aerosols that affect climate and contribute to transport of particulate pollution across oceans. Developing new technology for new measurements will help future scientists study how aerosols affect climate and how these particles change clouds and rainfall.

In the past, Lorraine worked as a volunteer with the Girl Scouts of Central Maryland and collaborated with the Girl Scout Council to develop the Planet Earth Patch, a program designed to introduce girls to Earth system science. She also was a guest speaker in K-12 classrooms and in home school groups. During her years at Goddard she has mentored more than a dozen undergraduate, high school, and middle school students through various internship programs.

"Some of the fascinating things about being a scientist at NASA are to be able to experiment with things you have been dreaming about, go to different places for field experiments, and have the great opportunity to meet people from all over the world."

JANE RIGBY

Astrophysicist
(NASA GSFC civil servant)

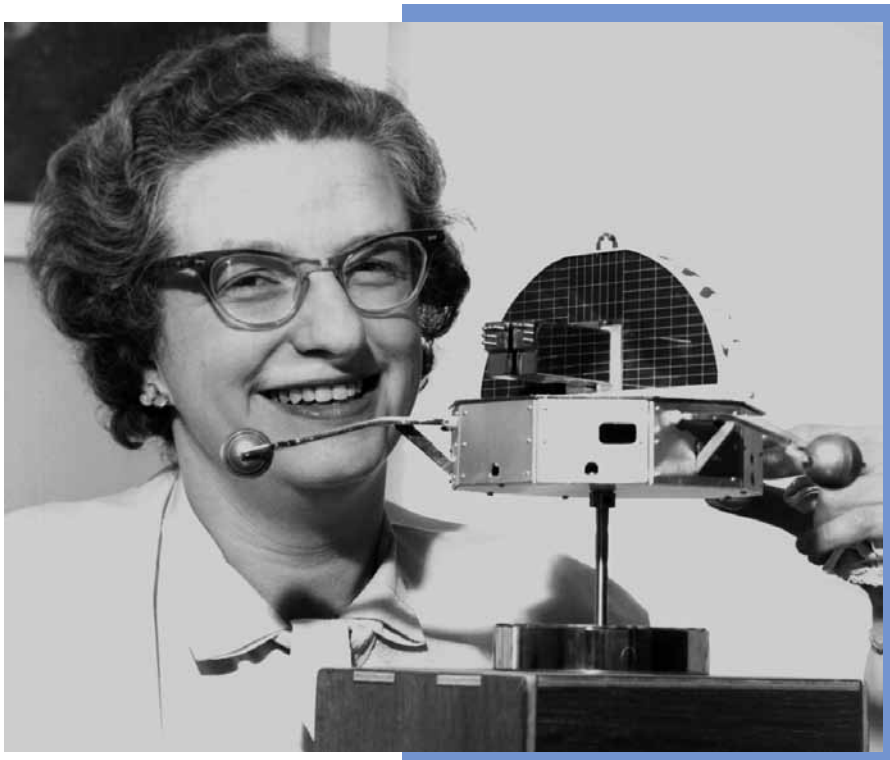
As an observational astrophysicist, Jane Rigby spends several weeks per year at some of the finest telescopes on Earth, including the twin 10-meter-across Keck Telescopes in Hawaii and the twin 6.5-meter-across Magellan Telescopes in Chile. She also uses the Hubble, Spitzer, and Chandra space telescopes. In her research, Jane studies how galaxies form new stars, and how black holes in the centers of galaxies feed and grow. As a Deputy Project Scientist, Jane is working to build the James Webb Space Telescope (JWST), which has a much bigger mirror than Hubble (6.5 meters versus 2.5 meters), but weighs only half as much as the much-smaller Hubble Space Telescope. The Webb telescope will take pictures and spectra of the first galaxies in the Universe and will chart how galaxies evolved into the modern day.

Jane in front of the Magellan telescopes at the Las Campanas Observatory in Chile, following a successful night of observations from the left telescope, April 2009.

"Last Tuesday at 3 a.m., Hubble observed a gorgeous galaxy for me. A few hours later, Hubble beamed the data to Baltimore. By lunchtime, I'd finished downloading the data to Goddard, and got to be the first person on Earth to see the beautiful Hubble image. On days like that, it's really obvious to me how lucky I am to be paid to figure out how the Universe works, and to help make a telescope that will be far more capable than Hubble."

NANCY GRACE ROMAN

Astronomer
(Contractor with ORI and MacDonald Douglas; retired)



Nancy with a model of the Orbiting Solar Observatory (OSO) satellite circa 1965.

Shortly after NASA was formed, Nancy Grace Roman was asked if she knew anyone who would be interested in setting up a program in space astronomy. She was hesitant to leave research, but decided that starting with a clean slate to plan a program that would influence astronomy for 50 years was too big a challenge to turn down, and hence she joined NASA Headquarters when it was only six months old. During the next 21 years, Nancy organized a program of 20 satellites, including the Hubble, plus innumerable sounding rockets, airplane experiments, small experiments in the human space program, and a major balloon telescope, as well as a program of grants and contracts to support the flight program.

In 1979, Nancy took early retirement. Although family responsibilities made full-time work difficult, she continued to work about half time for various contractors supporting Goddard. She started as a consultant to ORI, where she worked primarily on the Hubble Space Telescope and a little on the Chandra X-ray Observatory. She also did two studies of ways of measuring geodetic plate motions and wrote brochures. She then joined the Astronomical Data Center, where she prepared machine-readable versions of astronomical catalogs for archiving to make them easily accessible to the entire astronomical community. Although she continued to work there until 1997, ending as director of the Data Center for several years, she also supported the Earth observing system while working for McDonald Douglas after ORI lost the Goddard contract.

"If you enjoy solving puzzles, science or engineering may be the field for you."

BARBARA L. SCOTT

Flight Software Manager
(NASA GSFC civil servant)

Barbara Scott began her career at NASA Goddard in early 1977 after graduating from Towson State College (now Towson University) in 1976. Barbara knew since 6th grade that she wanted to work for NASA (living her favorite TV show *Star Trek* for real), but wasn't sure at all what she would actually do. She studied math and took all the computer science courses offered in college.

Barbara joined NASA when programming the small computers on satellites was a new field. For the next 34 years, Barbara wrote the software and then managed software development teams that wrote flight software for astronomy and Earth-observing satellites, including the International Ultraviolet Explorer, TIROS (used by NOAA and the National Weather Service), the Extreme Ultraviolet Explorer, the Earth Observing System's Aqua satellite, and the Hubble Space Telescope. Barbara also worked on software for the science payload on the third Space Shuttle mission (STS-3) and was a part of the operations support team for the first on-orbit Shuttle repair mission of a satellite (the Solar Max Repair Mission on STS 41-C). Her most exciting experiences included working in Mission Control for satellite launches and Shuttle missions, flying on the "Vomit Comet" (the NASA Zero-G airplane that creates weightlessness), and working with astronauts.

Barbara monitoring telemetry from the Goddard Launch Support Room during the launch of the Extreme Ultraviolet Explorer, June 1992.

Barbara's current position as the Flight Software Manager for the Hubble Space Telescope Operations Project means she is responsible for the payload and vehicle flight software, including the new software needed for the final Servicing Mission in 2009. Following retirement in a few years, Barbara plans to keep her interest in NASA alive by giving tours of the Goddard Space Flight Center and sharing NASA history and her experiences with school children.

"To prepare for a career in engineering, take challenging technical classes in school. Don't be afraid to stretch yourself. It can be stressful at times, but the rewards are both monetary and emotional. You get to work in a team environment to create something that has never been done before. Your contribution will be important, and when your mission is a success, there's no better feeling than celebrating the accomplishment with your teammates."

HEATHER SHINN

Program Manager
(Contractor with Parsons Infrastructure and Technology)

Photo by Debora McCallum

Heather at the refurbishment of the Goddard cafeteria, April 2011.

Heather Shinn is the Program Manager of her company's Facilities Construction, Engineering and Technical Services (FaCETS) contract at NASA Goddard. She is responsible for managing all aspects of the execution of the contract for Parsons. The Parsons FaCETS on-site staff is comprised of over 80 people, consisting of design professionals, construction professionals, craft labor, and information technology (IT) professionals. Projects include the design and construction of cleanrooms, central plant replacement units, utilities, roads, major building renovations, laboratory renovations, and other miscellaneous tasks. In addition, Parsons maintains the Goddard facilities management division databases for construction task orders, conducts life safety personnel tracking, and provides geographic information system (GIS) support to Goddard.

Heather has over 17 years of diverse experience working in the construction management and project management industry. Over five years of that experience were spent working in the oil and gas industry, and more than eight years were spent working on federal projects subject to the Federal Acquisition Regulations or other government agency regulation equivalents. She is a LEED (Leadership in Energy and Environmental Design) Accredited Professional and a CMAA (Construction Management Association of America) Certified Construction Manager. Heather has successfully built and led teams of engineers and construction industry professionals in geographically diverse locations while working on projects for the Federal Aviation Association, U.S. Army Corps of Engineers, U.S. Customs and Border Protection, and NASA.

"I have always had a love of math and science and the desire to create things. With an engineer dad, it was easy for me to find my way to a career in engineering. I enjoy tackling new challenges every day and leaving behind physical products of my hard work and technical knowledge. At NASA Goddard I have been able to manage a staff that designs and builds facilities that are used for cutting-edge scientific study, which has been very rewarding."

AMY SIMON-MILLER

Planetary Scientist
(NASA GSFC civil servant)

When Amy Simon-Miller was a child, she wanted to be the first woman to walk on Mars. While that has not happened yet, she has had a passenger-side view from robotic space missions that have flown to Jupiter, Saturn, and beyond. Her scientific research involves study of the atmospheres of the Giant Planets from past and current space missions. This study has meant opportunities as diverse as observing spectacular comet crashes into Jupiter, designing Cassini spacecraft operations at Saturn, and analyzing storms with winds that blow at hundreds of miles per hour.

Photo by Jay Friedlander

Amy presenting her "Science on a Sphere" tour of the solar system at the NASA Goddard Visitor Center, May 2011.

Amy is currently the Associate Director of Solar System Exploration at NASA Goddard. In her ten years at Goddard, Amy has used data from the Voyager, Galileo, New Horizons, and Cassini missions and is a regular user of the Hubble Space Telescope. She has also helped study plans for new missions to asteroids, the moons of Jupiter, and the moons of Saturn, requiring an understanding of spacecraft engineering, as well as science.

"You have to be flexible in your career (and life) and stay open to new opportunities. You just never know where a new path might lead you. It might be an amazing, once-in-a-lifetime experience, while also leading to other opportunities!"

JOANNE SIMPSON

Meteorologist
(NASA GSFC civil servant, deceased)

Photo courtesy of Fritz Hoelzl

Joanne aboard a C-130 aircraft during a research flight in 1973. This was part of the Florida Area Cumulus Experiment (FACE) led by Joanne to examine the value of cloud seeding for increasing precipitation.

By the time Joanne Simpson began her 30-year career at Goddard in the late 1970s, she was well known around the world as a research meteorologist with expertise in clouds and hurricanes. She had worked at the Woods Hole Oceanographic Institution and the National Weather Bureau and had been a professor at two different universities. She had headed an Experimental Meteorology Laboratory in Florida and had led Project Stormfury, the primary objective of which was to test the hypothesis that a hurricane's strength could be reduced by massively seeding the storm's eyewall.

Joanne's interest in clouds began in childhood and continued throughout her life. She taught meteorology to aviation cadets and military forecasters during World War II, after earning a pilot's license at age 16. She was told that becoming a meteorologist would be inappropriate for a woman because of having to work night shifts, but she persisted despite the warnings and in 1949 became the first female to receive a Ph.D. in meteorology. She established the importance of cumulus and cumulonimbus clouds in transporting energy from the warm tropical oceans to the upper atmosphere, and she initiated the mathematical modeling of clouds. Once at Goddard, Joanne turned her attention to the use of satellites for comprehensively studying tropical clouds, and she became Project Scientist of the Tropical Rainfall Measuring Mission (TRMM). TRMM was the first satellite to carry a meteorological radar into space, and it is still operating more than 13 years after launch, collecting vast amounts of information about clouds and precipitation in the tropics. Joanne died in 2010 at age 86.

"Any comparison between the way it was when I started and the way it is now is like comparing the covered wagon with a jet plane. But this doesn't mean that women don't still have obstacles to overcome. ... Sometimes you have to fight just to keep the opportunities you have."

MARIA M. SO

Safety and Mission Assurance Specialist
(NASA GSFC civil servant)

Maria on console during the launch of Glory, at Vandenberg Air Force Base, March 2011.

Maria So is the Deputy Director for the Safety and Mission Assurance Directorate at NASA Goddard. Her job is to lead her organization to provide management and implementation of Center policy in the areas of institutional and systems safety, mission assurance, independent systems reviews, independent cost estimates, and supply chain audits. As part of this job, between 2009 and 2011 Maria worked for several weeks in the mission control centers at Kennedy Space Center in Florida and Vandenberg Air Force Base in California, helping to prepare and launch four satellites: the Lunar Reconnaissance Orbiter, an unmanned satellite to create a comprehensive atlas of the Moon's features and resources; GOES-N and GOES-P, the latest in a series of Earth monitoring satellites; and Glory, an Earth-orbiting satellite that was intended to study aerosols and the total solar irradiance but that sadly failed to reach orbit. As the Spacecraft Safety and Mission Assurance Technical Authority, Maria and her team worked in each case to ensure that all the pre-launch risks were assessed and the launch operations were normal.

NASA's opportunities are as diverse as its employees, and Maria has taken full advantage of the situation. In her 19 years at NASA, Maria expanded from science data programming at the National Space Science Data Center into spacecraft commanding certification and verification for the Hubble Space Telescope. Maria stepped into leadership positions including branch chief for mission systems engineering for over 20 space missions and project manager for the NASA Technology Inventory. Maria co-authored several papers on topics including systems engineering technical authority, systems engineering capability improvement, and reconfigurable rapid response space systems.

"Coming to this country as an exchange student with $85.00 and a suitcase, it was beyond my dream to get my first job with NASA. Nineteen years later, I am still energized coming to work every morning. It is such a privilege working at NASA, contributing to the space exploration and advancing the understanding of the Earth's climate."

TERESA (TERRY) SPAGNUOLO

Facilities Engineering Supervisor
(NASA GSFC civil servant)

Photo by Allison Welck

Terry reviewing site plans with staff in her office at Goddard, May 2011.

Teresa "Terry" Spagnuolo is Chief of the Facilities Management Division at NASA Goddard. This is one of those jobs that generally go largely unnoticed but are extremely critical. While the engineers and scientists of Goddard are concentrating on building the next class of science instruments in their laboratories, Terry is concentrating on designing, building, and maintaining the laboratories, cleanrooms, and buildings that will enable the scientists and engineers to meet not only today's needs but the needs of many future projects as well. Reconfiguration and cost effectiveness are her goals, as evidenced by the state-of-the-art facilities designed into Goddard's new Exploration Sciences Building, a model facility for science and technology, as well as a sustainable complex meeting the rigid requirements of NASA's first "LEED Gold" distinction for a laboratory facility. Terry spends most of her days in meetings assessing the technical, cost, and schedule statuses of the hundreds of projects the organization manages. But she also spends time in the field visiting various plant operations functions, participating in meetings with local government entities, and participating in the occasional ribbon cutting ceremony for the latest built facility. Managing Goddard's real property assets, both locally and worldwide, is a challenging, rewarding, and yet daunting task.

In her 24-year career, Terry has supported other key functions, such as safety engineering, environmental engineering, and facilities planning. Terry focuses her energy nowadays in leading her organization into the next generation of facilities management. She firmly believes in the ideals of empowerment, delegation, responsibility, and accountability, and she believes it is her role to develop staff positions into tomorrow's leaders. Her management style provides the proper mix of guidance, supervision, and freedom to allow those on her team not only to succeed but also to grow as individuals.

"We all have an infinite capacity for learning. Always challenge yourself to reach for the stars."

CINDY STARR

Scientific Visualizer

(Contractor with Global Science and Technology)

Cindy in the Scientific Visualization Studio at Goddard, with illustrations from the Maya animation software in the background, April 2011.

Cindy Starr works as an animator in Goddard's Scientific Visualization Studio, creating scientific data visualizations to promote a greater understanding of Earth science. She works with a team of skilled computer scientists and physicists to create accurate representations of scientific data derived from both satellites and computer models. Her visualizations have been an integral part of scientific presentations, national news broadcasts, museum exhibits, classroom instruction, and science documentaries. Recently, she has created high resolution animations available in special formats such as for the spherical projection system known as Science on a Sphere, stereoscopic 3-dimensional (3-D) viewing, and full dome productions. These visualizations have portrayed the retreat of the Arctic polar ice cap, the ash plume from Iceland's Eyjafjallajökull volcano, the retreat of Greenland's Jakobshavn glacier, ice mass changes over Greenland, the spread of global wildfires, and much more. Cindy supports the efforts of the scientific community at NASA by providing an accurate representation of scientific findings in a way that is accessible and understandable.

"I am thrilled to have the opportunity to work with the science community at NASA and to have access to some of the most current data available showing the conditions on our home planet. With this work, I have the awesome responsibility to accurately communicate the research findings of our renowned scientists."

AMBER STRAUGHN

Research Astrophysicist
(NASA GSFC civil servant)

Amber Straughn uses data from the Hubble Space Telescope to study star formation in distant galaxies, in order to figure out the *big picture* of how and why galaxies change over time. Most recently, Amber has worked on spectroscopic data from Hubble's new Wide Field Camera 3, which was installed in the last Hubble Servicing Mission, in 2009. This new instrument allows us to see details of how galaxies form their stars with amazing new detail and efficiency. However, we have almost reached the limit of what Hubble can do in studying distant galaxies, which is why Amber is actively involved in the James Webb Space Telescope project, which will be Hubble's successor.

Amber doing a live television interview and cryogenic demonstration of the cold temperatures that the James Webb Space Telescope will have to endure in space, October 2010.

In addition to her research, Amber is actively involved in outreach to the public. She gives presentations to schools, astronomy clubs, and museums about the important new science questions that the James Webb Space Telescope will allow us to answer—ranging from the first galaxies to light up in the early universe, to observing planets around other stars. She has been involved in NASA programs since her undergraduate years, when she flew an experiment on NASA's microgravity plane.

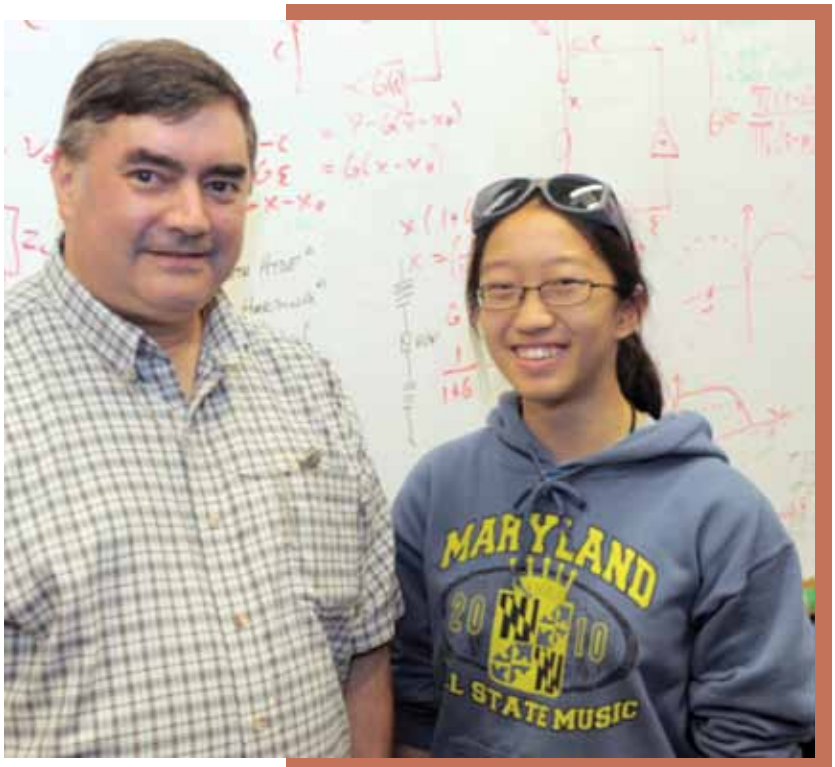
"One of the coolest things about working for NASA is that you actually get paid to do what you love. I look at distant galaxies for a living! And I get to look forward to the astronomy we will be able to do with the James Webb Space Telescope, as well as see the hardware as it comes into Goddard. There is always something fun going on here."

LILI SUN

High School Student
(NASA GSFC summer intern from River Hill High School, Clarksville, Maryland)

Inspired by watching the spacecraft MESSENGER launch when she was 11, Lili Sun was thrilled to have the opportunity to work as a 2010 summer intern at NASA Goddard while still a high school student. Lili worked under Dr. Jeffrey Livas on the Laser Interferometer Space Antenna (LISA) project. The mission of the project is to detect gravitational waves from a system of black holes using the space laser interferometer. Lili was amazed that one can detect giant black holes millions of light years away by looking at light on a scale of picometers!

During her internship, Lili got hands-on experience in the laboratory working with optics by characterizing the behavior of a laser collimator and by coupling a laser into an optical fiber. Lili also worked with computer coding, helping to write new code that combined the genetic algorithm with Markov chain Monte Carlo algorithms. The former uses ideas from natural selection, and the latter uses a probability distribution approach. This effort resulted in improved efficiency of data analysis for the LISA project. Lili realized that each small step, such as aligning a lens or writing a line of code, is an essential part of a large project. Her NASA internship intensified her interest in science and also her love of math and enjoyment in solving puzzles. Now, just as MESSENGER enters orbit around Mercury this year, Lili plans to enter a math and science path at M.I.T. this fall. She is very grateful for the internship at NASA, which helped to prepare her for her future journeys in science and engineering.



Lili with her mentor Jeffrey Livas in his laboratory at Goddard, July 2010.

"At NASA, I learned that a big project like LISA is the product of many smaller projects each made up of individual steps. These steps are simple, like screwing down optical parts or typing lines of code. However, as they accumulate, a bigger product comes into view. The progress made in each step requires a solid foundation in science, as well as dedication and hard work."

JEAN SWANK

Astrophysicist
(NASA GSFC civil servant)

Photo by Chris Gunn

Jean with two of her colleagues on the GEMS team in a laboratory at Goddard, June 2009.

Jean Swank is leading the Gravity and Extreme Magnetism Small Explorer (GEMS), a next generation X-ray observatory that will see the cosmos in a new way. As Principal Investigator of the mission, Jean oversees a large scientific and engineering team that is designing a mission to perform the first survey of X-ray polarization. The polarization of optical light has long been known, but GEMS will be the first mission to systematically sample polarization in X-ray wavelengths. Jean is excited that this technique will help probe the nature of spinning black holes and magnetic stars for the first time.

Before GEMS, Jean served as Project Scientist for the Rossi X-ray Timing Explorer (RXTE), in addition to shepherding the largest X-ray instrument at the time. She enjoyed participating in the operations of RXTE, which today still provides high timing resolution and broad spectroscopic data to the astrophysics community. Jean studied the rapid variations of black holes and neutron star systems, which provide clues to the nature of gravity and magnetism under the most extreme conditions.

"With NASA, the astrophysics community has been able to use the space age for tremendous advancements in scientific knowledge of the universe. To work on these is exciting, and at NASA there are a myriad of interesting aspects that individuals can work on."

FLORENCE TAN

Electrical Engineer

(NASA GSFC civil servant)

Florence, in cleanroom garb, after SAM Integration onto Curiosity, the Mars Science Laboratory Rover, January 2011. The MSL launch window opens the day after Thanksgiving, on November 25, 2011. SAM is the gold box by Florence's right hand. To the right is the first picture from Titan's surface.

Florence Tan has designed electronics on various mass spectrometers since 1991. Florence designed electronics that flew on the Cassini Orbiter as well as on the Huygens Probe. Cassini is still orbiting around Saturn, collecting valuable scientific data about the Saturnian system. Florence is currently the Electrical Lead Engineer for the Sample Analysis at Mars (SAM), an instrument on Curiosity, the Mars Science Laboratory (MSL) rover. Florence is also the Electrical Lead Engineer for the Neutral Mass Spectrometer (NMS) on the Lunar Atmospheric Dust Environment Experiment (LADEE) Spacecraft and the Neutral Gas Ion Mass Spectrometer (NGIMS) on the Mars Atmosphere and Volatile Evolution (MAVEN) spacecraft. Florence also volunteers as a math tutor for her neighbor's children and as a yoga teacher to her fellow engineers and scientists. When not busy, Florence likes to read about the etymology of English and other languages. She also loves to cook and eat Malaysian and Thai food.

"When I first saw the picture of Titan after the Huygens probe landed, I understood why I love working here. The very idea that we humans have the smarts, the sophistication and cooperation to build such complex hardware that can operate flawlessly after eight years' journey through the rather inhospitable environment of space is a testament to man's ingenuity and perseverance. It is such a privilege to be part of this group."

MICHELLE THALLER

Astronomer, Public Outreach Specialist
(NASA GSFC civil servant)

Michelle and her robot companion IR-1 in an IRrelevant Astronomy podcast, May 2007.

Michelle Thaller began her career as an observational astronomer, studying the atmospheres of massive stars that were close to exploding in a supernova. Throughout her time as a researcher, she was often asked to speak to the public, or work with students and teachers. During a post-doctoral research fellowship at Caltech, Michelle accepted a position with the Spitzer Space Telescope to lead their education and public outreach program, and she decided to make public outreach the main focus of her career.

Now at NASA Goddard, Michelle appears in numerous television programs on the History, Discovery, and National Geographic channels. She also hosts several video podcasts, such as IRrelevant Astronomy (seen above). Behind the scenes, Michelle organizes teacher workshops, writes proposals for education funding, serves as a science editor, and advocates the effective use of new media for NASA. Now serving as the Assistant Director of Science for Communication at Goddard, she helps to lead the education and outreach efforts of the entire center.

"Public engagement is not a secondary effort for NASA –if the public does not feel involved, then we are not doing our job. After all, we're using their money. And really, what is more amazing than studying the universe? This is powerful, life-changing stuff, and everyone should be able to enjoy it."

SABRINA THOMPSON

Aerospace Engineer
(NASA GSFC civil servant)

Photo by Hernan Castellanos

Sabrina working on training material for her Professional Intern Program (PIP) Project on Spacecraft Maneuver Detection, Characterization, and Recovery, April 2011.

In January 2010 Sabrina Thompson was hired as an aerospace engineer in the Occupational Safety and Health Division at NASA Goddard. Her job included working with a team of safety experts to keep everyone at Goddard safe and protected in the workplace by identifying potential hazards and creating solutions to mitigate them. Part of this effort included developing programs, policies, and processes to ensure safety in the workplace.

As of late March 2011, Thompson is working on her Professional Intern Program (PIP) assignment in the Navigation and Mission Design Branch at NASA Goddard. Her work includes developing methods to identify spacecraft maneuvers from ephemerides and observation residuals, assessing their severity, and creating a reporting methodology.

In her first 15 months at NASA, Thompson was selected to participate in the Women@NASA initiative, serves as Vice-President for the National Society of Black Engineers Alumni Extension – Greenbelt Space Chapter, and serves as a member on the Goddard Developing Professionals Committee.

"As a child, I would have never imagined that my competitive nature and probing mind would land me in a place where unique and exciting challenges and discoveries beyond our world take place. NASA is the perfect place for the inquisitive mind to explore beyond Earth's atmosphere and into the mysterious universe."

ANNIE TSAO

Structural Engineer
(Contractor with Parsons Infrastructure and Technology Group)

Annie working on a new foundation design in her office at Goddard, April 2011.

Since Annie Tsao came to NASA Goddard in 2008, she has designed various buildings and structures for facilities on Center that support NASA's mission. Annie enjoys working as a Structural Engineer because the discipline is the fundamental building block for everything; the work could be as small as providing a support for a heavy mechanical unit to as grand as designing a multi-story laboratory building. Annie has designed a heavy-duty foundation to support a three-story-tall satellite antenna used to collect radio frequencies from a quasar, which provides data that help to analyze earthquake patterns. The foundation was designed to support the antenna in such a way that under a 100-mile-per-hour wind, the antenna would not deflect more than 0.000133 degrees.

Annie provided the structural design for the new Logistics Facility that is currently under construction at Goddard, to support its center-wide logistics function, and she also serves as the Accredited Professional in Leadership in Energy and Environmental Design (LEED), in charge of helping the new building achieve a Silver rating issued by the U.S. Green Building Council. Apart from being proud of her role here at NASA, Annie also works abroad in the Pacific, utilizing her Civil/Structural and LEED expertise on master planning projects for the Air Force and Navy.

"When people ask me what I do here at NASA, I always tell them that I play the supporting role, the person in the background. People's response might be, 'you mean like the person in the background setting up the scene for a play?' While that might be partially true, I see my role as one that makes all possible, because I'm actually the one who builds the stage; without the stage, where would Romeo and Juliet perform?"

NZINGA TEMPLE TULL

Chief Systems Engineer
(Contractor with Jackson and Tull)

Nzinga Tull has worked with the Hubble Space Telescope (HST) mission operations team since July 1998. She joined the HST team as an electrical power subsystem system engineer supporting normal operations and on-orbit anomaly investigation during the science mission, as well as supporting two Hubble servicing missions. She served as the leader of the power subsystem planning shift during servicing mission 3B, a particularly critical and challenging mission for power systems, since both the solar arrays and the power control unit were replaced. Nzinga currently works as a member of the HST engineering systems management team, having served as tiger team lead for the last servicing mission, and she supports the system-wide planning and coordination of on-orbit activities. She was selected to represent the HST Mission Operations Team in various public forums, including *60 Minutes* (CBS), *Behind Closed Doors with Joan Lunden* (A&E Network), and the HST 15th Anniversary Symposium at Goddard Space Flight Center.

A native Washingtonian, Nzinga earned mathematics and engineering degrees from Spelman College, Georgia Institute of Technology, and the University of Maryland, College Park. She's active in the National Society of Black Engineers and the National Alumnae Association of Spelman College, and is on the Board of Teaching for Change, an education and social justice non-profit organization. Additionally, Nzinga enjoys another passion, traditional West African dance. Performing professionally for 14 years, she is a senior dancer with Kankouran West African Dance Company.

Nzinga taking a break between HST meetings at her office near NASA Goddard, April 2011.

"It has been extremely challenging and humbling to work on a system as complex and high profile as HST, with engineers who are experts in their respective fields and virtually walking encyclopedias of HST design and operations. I feel immense pride in being able to point to flight hardware that I helped test or command routines that I developed, because these are tangible examples of how my work has contributed to NASA's most prolific science mission and a real national treasure."

NICHOLEEN VIALL

Solar Physicist
(NASA GSFC Postdoctoral Fellow)

Nicholeen explaining solar coronal heating to a colleague in her office at Goddard, April 2011.

Nicholeen Viall came to Goddard as a NASA Postdoctoral Program Fellow to investigate the heating of the solar corona. Although the solar surface (the photosphere) is already a very hot 6,000 Kelvin, the Sun's atmosphere (the solar corona) is heated to temperatures of over a million Kelvin. The mechanism of this remarkable heating has eluded scientists for decades, and solving this so-called coronal heating problem is one of the current outstanding challenges of stellar and solar physics. Nicholeen utilizes the spectacular new data taken with the Atmospheric Imaging Assembly (AIA) on board the Solar Dynamics Observatory (SDO) to address the coronal heating problem. She models how coronal plasma responds to different coronal heating scenarios and tests theories of coronal heating by comparing the model predictions with the SDO/AIA data. Much of the solar coronal plasma escapes from the Sun and reaches supersonic speeds as it flows outwards, becoming the solar wind. This solar wind eventually interacts with the Earth and its magnetic field, causing geomagnetic activity. Nicholeen also studies properties of the solar wind and how its variability affects the Earth.

"My favorite thing about my job is learning and discovering new things about the Sun and how it interacts with the Earth. The potential for understanding some piece of our world that hasn't been understood before is incredible. Additionally, NASA is such an exciting place to be, with so many opportunities to collaborate with other scientists on other amazing projects."

JANELLE VORREITER

Thermal Engineer
(Contractor with Orbital Sciences Corporation)

Janelle standing beside a poster of the contract she is currently supporting, outside her office at Orbital Sciences, March 2011.

Janelle Vorreiter has been a thermal engineer on various launch vehicles and satellites for the past 20 years. As a thermal engineer, she helps to design, analyze, build, and test components of space vehicles to ensure the thermal performance of the mission. She has been a part of the thermal engineering team on the Taurus and Pegasus launch vehicles to ensure the thermal performance of the mission. As part of these teams, she has watched nervously from the control room on numerous occasions. She never tires of seeing launches of the vehicles, as it is still amazing what the space program has been able to accomplish: sending equipment to study the planets, the Sun, and the stars. Janelle's most recent project involved thermal engineering on the Sample Analysis at Mars (SAM) instrument for Curiosity and the Mars Science Laboratory (MSL) Rover. The Rover is expected to launch in late 2011, arriving at Mars approximately nine months later. It will be exciting to see the findings of SAM, in the hopes that information can be obtained about the present or past existence of life on the red planet.

When not working as an engineer, Janelle enjoys traveling, gardening, cooking, and spending time with her family.

"It is very exciting to work on instruments that will end up in space, studying the universe in which we live. To think that equipment I helped to design and build will end up on the surface of Mars is truly amazing."

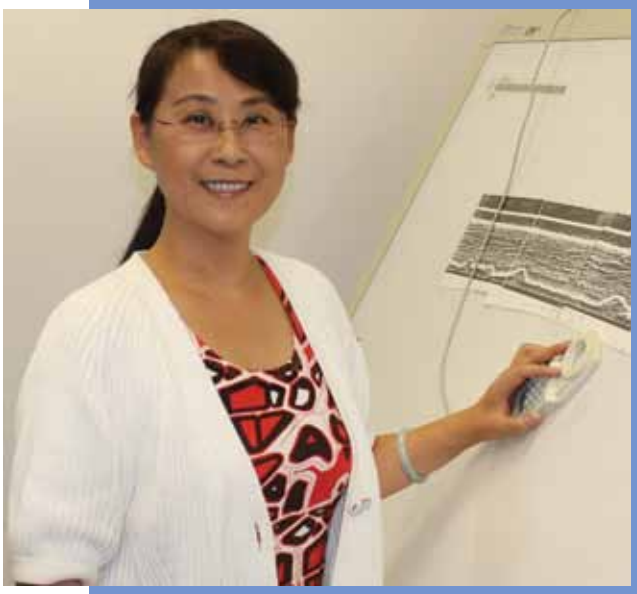
Wei Li Wang

Glaciologist
(Contractor with Stinger Ghaffarian Technologies, better known as SGT)

Wei Li Wang studies the dynamics of ice masses through both theory and experiment. Her research emphasizes numerical modeling of ice flow to investigate the changes in ice sheets.

Wei Li has performed detailed laboratory experiments of the physics of ice flow, which is fundamental research for ice dynamics studies. With a strong knowledge of ice rheological properties, she developed ice flow models allowing non-uniform ice crystals. These models successfully describe the flow behavior of ice sheets and have been applied to the Antarctic and Greenland ice sheets as well as the Martian polar ice caps. Wei Li also incorporates data from satellites and field measurements in her modeling studies. The satellite data include data from the Ice, Clouds, and land Elevation Satellite (ICESat), the European Remote Sensing (ERS) Satellite radar altimeters, and the Mars Orbiter Laser Altimeter (MOLA).

Wei Li's model contributes to the NASA-led Sea-level Response to Ice Sheet Evolution (SeaRISE) project, a community ice-sheet modeling effort to provide quantitative estimates of ice sheet contributions to sea level rise in the 21st century. In her free time, she enjoys Chinese folk dance, tai chi, aerobics, and collecting stamps and coins.



Wei Li using a digitizer in her office at NASA Goddard, June 2011, to trace the internal layers of the Antarctic ice sheet as revealed from Radio-Echo Sounding imagery obtained from an Antarctic field expedition.

"Working at NASA makes me widen my eyes and mind and feel that my research is meaningful."

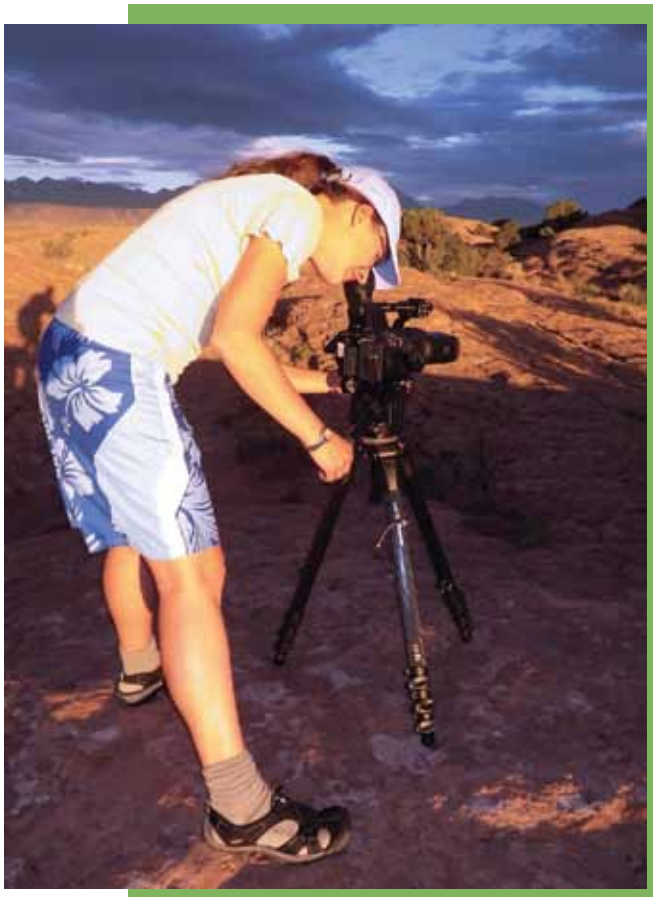
VICTORIA WEEKS

Filmmaker
(Contractor with Honeywell Technology Solutions)

Vicky Weeks has the very interesting and rewarding job of being a filmmaker for NASA. She has served at Goddard for ten years and finds that there is always something amazing just around the corner — or the world. She has shot live webcasts in many remote locations, from mountaintops in Hawaii to ice sheets floating over the North Pole! Communicating with the public about NASA's role in Earth science has always been one of her favorite parts of working at Goddard.

In 2006, Vicky was the lead editor and compositor for *Footprints*, a movie about studying Earth from space and the first film ever created for Science on a Sphere, a large spherical projection system. After completing three more films for Science on a Sphere, she dove head-first into developing 3-D filmmaking for NASA, and she has recently co-produced Goddard's first ever 3-D production *Deep World*.

Vicky believes whole-heartedly in respecting and studying the Earth; and working at NASA allows her to be right where the action is. When she's not working hard on a production deadline, Vicky loves to get outside and enjoy the planet.



Vicky shooting 3-D video for *Deep World* with a prototype camera in Moab, Utah, August 2010.

"The world of video production is full of hard days and long nights. That is what it takes to make something special, something that people will learn from and remember. I am struck by how we have come so far in our understanding of the globe, from the first earthrise photograph in 1968 to our modern, complex, and varied view streaming down from satellites. I'm honored to be a part of telling such a story."

DEIRDRE WENDEL

Space Plasma Physicist
(NASA GSFC civil servant)

When Deirdre Wendel was growing up, she wanted to be a ballerina and a scientist. She did both—first dancing ballet professionally, then attending college and graduate school and becoming a physicist in 2009. For Deirdre, art and science are really different aspects of the same thing, because they both require great skill and creativity. Now that Deirdre is doing research in space plasma physics at NASA Goddard, she enjoys the benefits of working with some of the best scientists in the world in her research area. She studies the problem of magnetic reconnection in space—a process whereby magnetic fields from different sources become taut and break and connect to one another, which transforms large amounts of magnetic energy into particle energy. Although this process occurs throughout the universe, her group at Goddard studies it in the solar wind and at the Earth's magnetopause, where the Sun and the Earth's dipole magnetic fields meet. Reconnection allows solar wind particles and energy to enter the magnetic bubble, or magnetosphere, around the Earth. Scientists still do not fully understand the underlying physics of reconnection, such as what breaks the field lines and why it occurs so rapidly. Deirdre has contributed to the science of NASA's Magnetospheric Multiscale (MMS) mission, which is scheduled to launch in 2014. The mission will send a suite of four identical spacecraft to various parts of the magnetosphere with the express purpose of resolving some of the mysteries of magnetic reconnection.

Photo by Jay Friedlander

Deirdre in front of an image of the Earth's magnetosphere at NASA Goddard, April 2011.

"When the going gets tough, get tough and keep going."

JENNIFER WISEMAN

Astrophysicist
(NASA GSFC civil servant)

Jennifer at the Goddard Visitor Center, August 2010, with a model of the Hubble Space Telescope and basking in the beauty of the Whirlpool Galaxy, as imaged by Hubble.

Jennifer Wiseman serves as the Senior Project Scientist for the Hubble Space Telescope (HST), a role she assumed in 2010 after supporting the spectacularly successful Servicing Mission 4 just the year before, during which astronauts upgraded the telescope with new and repaired instruments. No stranger to Hubble, Jennifer earlier served for several years as the Program Scientist for HST at NASA Headquarters. Jennifer is interested in how galaxies, stars, and planets form and evolve over time. Her own research delves into the earliest stages of star formation. For several years she served as Chief of Goddard's Laboratory for Exoplanets and Stellar Astrophysics, leading scientists who study stars and the disk zones around them where planets form.

Jennifer is also interested in how science fits into the bigger picture of society and values. She served as a Congressional Science Fellow working with the House Committee on Science, and she currently directs the Dialogue on Science, Ethics, and Religion for the American Association for the Advancement of Science. As an undergraduate, she unexpectedly discovered a comet that now bears her name! Jennifer loves nature, animals, and especially her cats.

"What I love about astronomy is the spectacular beauty of everything from moons to galaxies and imagining what it would be like to visit those places currently beyond our physical reach. The happiest surprise about my career path was finding out that there are lots of choices and unexpected opportunities that crop up along the way, even when you choose 'a road less travelled'. Furthermore, at NASA I can do serious astronomy research within the context of the excitement of space missions – an incomparable privilege."

EVE WOOLDRIDGE

Contamination Control Engineer
(NASA GSFC civil servant)

Eve Wooldridge is currently the lead Contamination Control Engineer on the James Webb Space Telescope. All optical systems must be very clean at a microscopic level in order to work properly. Eve determines requirements for all of the surfaces and sets up how all of the hardware will be built and tested. This includes a process called "baking out" the hardware so that molecular contamination does not adhere to sensitive surfaces once on orbit, and it involves working in cleanrooms wearing special garments to prevent particulate contamination from getting on the hardware.

Photo by Peter Rumler

Eve inspects an Ariane 5 rocket fairing at the Centre Spatial Guyanais in French Guyana, April 2009. This was the fairing used in the launch of the Herschel-Planck spacecraft.

Eve's favorite part of her job is making sure that the rocket that will launch the spacecraft is clean enough. This is important because when the rocket launches, particulate contamination on the surfaces just above the spacecraft could shake off and land on the spacecraft. Eve has spent many months at launch sites in California, Florida, the former Soviet Union, and French Guyana making sure that her spacecraft and rockets are clean and ready for launch.

"When I was in high school, I resisted the idea of going into engineering because I wanted to work with people. Because I was good at math and science, I majored in chemical engineering anyway, and then got a job at NASA. I have come to find that most of what I do is work with people, and since it is doing exciting NASA work, I love it. We work on projects in teams, and that is very enjoyable for me."

DOROTHY J. ZUKOR

Nuclear Engineer
(NASA GSFC civil servant)

Dot Zukor knew that she wanted to work for NASA when she saw the first rockets headed into space. Her dreams took a temporary detour when the space program started to wind down about the time she was in graduate school. Recognizing that the nuclear power industry was growing, she proceeded to get her doctorate in nuclear engineering. She then gained experience in safety analysis and risk assessment and came to NASA as a payload safety manager following the Challenger accident.

At Goddard, Dot has undertaken many roles. She was the first Project Science Office manager for the Earth Observing System (EOS), a massive satellite project intended to perform a "physical of the Earth from space". She participated in EOS's design, implementation, and operation. The data that the EOS instruments have generated (and continue to generate) are a treasure freely available to all the world to mine for knowledge.

Dot also served as the senior science official in the design and construction of Goddard's building 33, which was built to bring all of Goddard's Earth scientists together to encourage interdisciplinary research. She is additionally a charter member of Goddard's Diversity Council. This has been extremely rewarding, as Goddard has consciously worked to change its demographics over the last 15 years, and has actively worked to understand diversity barriers and to eliminate or overcome them. Finally, Dot is the Center Mentoring and Coaching Champion and a certified coach herself.

Photo by Debora McCallum

Dot at Goddard examining satellite images derived from the Earth Observing System, June 2011.

"Do not abandon your dreams lightly. Persistence is a trait often underestimated."

Appendix: Education
High Schools and Colleges/Universities Where the Women Profiled Received Their Degrees

Georgette Alexander-Morrison
- Sandalwood Junior/Senior High School, Jacksonville, Florida.
- University of Florida, Gainesville, Florida, B.S. Materials Science and Engineering.
- University of Tennessee, Knoxville, Tennessee, M.S. Industrial Engineering.

Adriana Apolito-Bevis
- Regina High School, Adelphi, Maryland.
- Tufts University, Boston, Massachusetts, B.S. Mechanical Engineering.
- George Washington University, Washington, D.C., M.S. Engineering Management.

Lisa Bartusek
- John F. Kennedy, Jr., High School, Wheaton, Maryland.
- University of Maryland, College Park, Maryland, B.S. Electrical Engineering.
- Johns Hopkins University, Whiting School of Engineering, Baltimore, Maryland, M.S. Electrical Engineering.

Katherine Bender
- Springbrook High School, Silver Spring, Maryland.
- University of Maryland, College Park, Maryland, B.S. Horticulture Science and Secondary Education/Biology.
- Johns Hopkins University, Baltimore, Maryland, M.S. Interdisciplinary Science Studies in Environmental Science and Policy.

Susan Breon
- Schuylkill Haven Area High School, Schuylkill Haven, Pennsylvania.
- Pennsylvania State University, State College, Pennsylvania, B.S. Nuclear Engineering.
- University of Wisconsin, Madison, Wisconsin, Ph.D. Nuclear Engineering.

Pamela Brinckerhoff
- Canton High School, Canton, Michigan.
- University of Michigan, College of Engineering, Ann Arbor, Michigan, B.S.E. Aerospace Engineering.

Beth Brown
- William Fleming High School, Roanoke, Virginia.
- Howard University, Washington, D.C., B.S. Astrophysics.
- University of Michigan, Ann Arbor, Michigan, Ph.D. Astronomy.

Kris Brown
- Pine Grove Area High School, Pine Grove, Pennsylvania.
- Virginia Tech, Blacksburg, Virginia, B.S. Civil Engineering.

Molly E. Brown
- Stonington High School, Stonington, Connecticut.
- Tufts University, College of Arts and Sciences, Medford, Massachusetts, B.S. Biology and Environmental Sciences.
- University of Maryland, College Park, Maryland, Ph.D. Geography.

Darlene Brummell
- Easton High School, Easton, Maryland.
- Howard University, School of Architecture, Washington, D.C., Bachelor of Architecture.

Lisa Wood Callahan
- Rochester Adams High School, Rochester, Michigan.
- University of Michigan, Ann Arbor, Michigan, B.S. Aerospace Engineering.
- George Washington University, Washington, D.C., M.S. Science, Technology, and Public Policy.

Ann Hornschemeier Cardiff
- Georgetown Junior/Senior High School, Georgetown, Ohio.
- Drake University, Des Moines, Iowa, B.S. Physics and Mathematics.
- Pennsylvania State University, State College, Pennsylvania, Ph.D. Astronomy and Astrophysics.

Candace Carlisle
- Penncrest High School, Media, Pennsylvania.
- College of William and Mary, Williamsburg, Virginia, B.S. Computer Science and Physics.
- Johns Hopkins University, Baltimore, Maryland, M.S. Technical Management.

Nancy Carosso
- Gateway High School, Aurora, Colorado.
- University of Denver, Denver, Colorado, B.S. Physics and Philosophy.

Lynn Carter
- Champaign Central High School, Champaign, Illinois.
- University of Illinois, Urbana, Illinois, B.S. Astronomy/Physics.
- Cornell University, Ithaca, New York, Ph.D. Astronomy.

Sandra Alba Cauffman
- Luis Dobles Segreda, San Jose, Costa Rica.
- George Mason University, Fairfax, Virginia, B.S. Electrical and Computer Engineering, and B.S. Physics.
- George Mason University, Fairfax, Virginia, M.S. Electrical and Computer Engineering.

Rachael Celestine
- Prince George's Community College, Largo, Maryland, A.S. Electrical Engineering.
- University of Maryland, College Park, Maryland, B.S. Electrical Engineering.

Katie Chakola
Middletown High School, Middletown, Maryland.
University of Maryland, School of Architecture,
College Park, Maryland, B.S. Architecture.
Illinois Institute of Technology, College of Architecture,
Chicago, Illinois,
Master of Architecture.

Nona Minnifield Cheeks
Bowie High School, Bowie, Maryland.
University of Maryland, College Park, Maryland, B.S.
Loyola College, Baltimore, Maryland, M.B.A.

Ruth W. Cholvibul
Springbrook High School, Silver Spring, Maryland.
Catholic University of America, Washington, D.C.,
B.S. Mechanical Engineering.
Stanford University, Stanford, California,
M.S. Mechanical Engineering.

Jenny (Zhiping) Chu
Beijing #1 High School, Beijing, China.
Beijing Institute of Technology, Beijing, China,
B.S. Optics.
University of Maryland, College Park, Maryland,
Ph.D. Chemical Physics.

Mary Cleave
Great Neck North Senior High School,
Great Neck, New York.
Colorado State University, College of Natural Sciences,
Fort Collins, Colorado,
B.S. Biological Sciences.
Utah State University, College of Engineering,
Ph.D. Civil and Environmental Engineering.

Yaireska (Yari) M. Collado-Vega
Colegio Sagrada Familia, Ponce, Puerto Rico.
Universidad de Puerto Rico, Mayagüez, Puerto Rico,
B.S. Theoretical Physics.
Catholic University of America, Washington, D.C.,
M.S. Physics.

Carmel Conaty
Academy of Saint Joseph, Brentwood, New York.
Catholic University of America, Washington, D.C.,
Bachelor of Mechanical Engineering.
Catholic University of America, Washington, D.C.,
Master of Mechanical Engineering.

Martha Dawsey
Marietta High School, Marietta, Georgia.
Agnes Scott College, Decatur, Georgia,
B.A. Astrophysics.
University of Arizona, College of Optical Sciences,
Tucson, Arizona,
M.S. Optical Engineering.

Georgia Adair de Nolfo
Stoneleigh Burnham School, Greenfield, Massachusetts.
University of Chicago, Chicago, Illinois,
B.S. Physics.
Washington University, St. Louis, Missouri,
Ph.D. Physics.

Shirley Dion
Cardinal Gibbons High School,
Lauderdale-by-the-Sea, Florida.
Rensselaer Polytechnic Institute, Troy, New York,
B.S. Chemical Engineering.

Anne Douglass
Immaculate Conception High School,
Montclair, New Jersey.
Trinity College (now Trinity University),
Washington, D.C., B.A. Physics.
Iowa State University, Ames, Iowa, Ph.D. Physics.

Darilyn M. Dunkerley
Division Avenue High School, Levittown, New York.
Long Island University (C.W. Post Campus),
Brookville, New York,
B.S. Information Management.

Kelly E. Fast
Campbell Hall High School,
North Hollywood, California.
University of California, Los Angeles (UCLA), California,
B.S. Astrophysics.
University of Maryland, College Park, Maryland,
Ph.D. Astronomy.

Sharon Marie Garrison
High Point High School, Beltsville, Maryland.
University of Maryland, College Park, Maryland,
B.S. Agricultural Chemistry.

Holly Gilbert
Interlochen Arts Academy, Interlochen, Michigan.
University of Colorado, Boulder, Colorado,
B.A. Physics.
University of Oslo, Oslo, Norway,
Ph.D. Theoretical Astrophysics.

Heather Goo
The Holton-Arms School, Bethesda, Maryland.
Massachusetts Institute of Technology,
Cambridge, Massachusetts,
B.S. Economics and
Bio-Electrical Engineering.
University of Maryland School of Law,
Baltimore, Maryland, J.D.

Karen Halterman
Orleans American High School, Orleans, France.
University of Maryland, College Park, Maryland,
B.A. Economics.

Chanté Hill
Suitland High School, Suitland, Maryland.
Tennessee State University, College of Engineering,
Nashville, Tennessee,
B.S. Electrical Engineering.

N. Christina Hsu
Kaohsiung Girls' High School, Kaohsiung, Taiwan.
National Taiwan University, Taipei, Taiwan,
B.S. Atmospheric Sciences.
Georgia Institute of Technology, Atlanta, Georgia,
Ph.D. Earth and Atmospheric Sciences.

Gail Skofronick Jackson
Leon High School, Tallahassee, Florida.
Florida State University, Tallahassee, Florida,
B.S. Electrical Engineering.
Georgia Institute of Technology, Atlanta, Georgia,
Ph.D. Electrical Engineering.

Telana Jackson
Garfield High School, Seattle, Washington.
Morgan State University, Baltimore, Maryland,
B.S. Electrical Engineering.
Morgan State University, Baltimore, Maryland,
D.Eng. Electrophysics.

Christyl Johnson
Green Run High School, Virginia Beach, Virginia.
Lincoln University of the Commonwealth of
Pennsylvania, Lincoln University, Pennsylvania,
B.S. Physics.
Pennsylvania State University, State College, Pennsylvania,
M.S. Electrical Engineering.

Felicia Jones
Western High School, Baltimore, Maryland.
University of Maryland Baltimore County,
Baltimore, Maryland,
B.A. Biology/Chemistry.
Howard University, Washington, D.C.,
B.S. Mechanical Engineering.
Johns Hopkins University, Baltimore, Maryland,
M.S. Management Science.

Sarah Jones
Poultney High School, Poultney, Vermont.
Dartmouth College, Hanover, New Hampshire,
B.A. Physics.
University of New Hampshire,
Durham, New Hampshire,
Ph.D. Physics

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University of Santo Tomas High School,
Manila, Philippines.
University of Santo Tomas, Manila, Philippines,
B.S. Mathematics and Physics.

Caroline Kilbourne
Steinert High School (Hamilton High School East),
Hamilton, New Jersey.
Princeton University, Princeton, New Jersey,
B.S.E. Electrical Engineering and
Computer Science.
Stanford University, Stanford, California,
Ph.D. Materials Science and Engineering.

Anne Kinney
Lancaster Senior High School, Lancaster, Wisconsin.
University of Wisconsin, Madison, Wisconsin,
B.A. Physics and Astronomy.
New York University, New York, New York,
Ph.D. Physics.

Lora Koenig
North Eugene High School, Eugene, Oregon.
Linfield College, McMinnville, Oregon,
B.A. Mathematics.
University of Washington, Seattle, Washington,
Ph.D. Geophysics.

Anne Koslosky
Elizabeth Seton High School, Bladensburg, Maryland.
University of Maryland, College Park, Maryland,
B.S. Computer Science.
George Washington University, Washington, D.C.,
M.S. Computer Engineering.

Barbara Lambert
Severna Park High School, Severna Park, Maryland.
Frostburg State University, Frostburg, Maryland,
B.S. Education.

Nancy Laubenthal
Grover Cleveland High School, St. Louis, Missouri.
Washington University, St. Louis, Missouri,
B.S. Applied Mathematics and
Computer Science.

Jacqueline Le Moigne
Lycée Marie Curie, Sceaux, France.
University Pierre and Marie Curie, Paris, France,
B.S. Mathematics.
University Pierre and Marie Curie, Paris, France,
Ph.D. Computer Science.

Mackenzie Lowrance
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Colorado Springs, Colorado,
B.S. Electrical Engineering.

Maureen Madden
Oak Forest High School, Oak Forest, Illinois.
Lewis University, Romeoville, Illinois, B.S. Physics.
Northern Illinois University, DeKalb, Illinois,
M.S. Applied Physics.

Kathy Malnick
North Marion High School, Farmington, West Virginia.
West Virginia University, Morgantown, West Virginia,
B.S. Computer Science.
East Tennessee State University, Johnson City, Tennessee,
M.S. Software Engineering.

Nancy Maynard
Deering High School, Portland, Maine.
Mary Washington College, Fredericksburg, Virginia,
B.S. Biology-Chemistry.
University of Miami, Rosenstiel School of Marine &
Atmospheric Science, Miami, Florida,
Ph.D. Marine Biology.

Lisa Mazzuca
The Catholic High School, Baltimore, Maryland.
Loyola College, Baltimore, Maryland,
B.S. Mathematics.
University of Maryland, College Park, Maryland,
Ph.D. Astronomy.

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Snohomish Senior High School, Snohomish, Washington.
Western Washington University, Bellingham, Washington,
B.S. Manufacturing Engineering Technology.

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Goucher College, Towson, Maryland,
B.A. Mathematics.
University of Maryland, College Park, Maryland,
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Cheney High School, Cheney, Washington.
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B.S. Physics.

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B.A. Mathematics.
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University of Maryland, A. James Clark School of
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B.S. Aerospace Engineering.
University of Maryland, A. James Clark School of
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Katherine Melocik
Linganore High School, Frederick, Maryland.
University of Maryland Baltimore County,
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B.A. Political Science and
B.S. Environmental Science.

Nargess Memarsadeghi
Nedaye Azadi, Tehran, Iran.
University of Maryland, College Park, Maryland,
B.S. Computer Science.
University of Maryland, College Park, Maryland,
Ph.D. Computer Science.

Pamela Millar
Tottenville High School, Staten Island, New York.
Rutgers University, College of Engineering,
Piscataway, New Jersey,
B.S. Electrical Engineering.
Rice University, Houston, Texas,
Ph.D. Quantum Electronics.

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Philip Schuyler High School, Albany, New York.
Harrington Harrison College, Saigon, South Vietnam,
B.A. Mechanical Design.

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College of Charleston, Charleston, South Carolina,
B.S. Marine Biology.
University of Charleston, Charleston, South Carolina,
M.S. Marine Biology.

Carey Noll
South Hagerstown High School, Hagerstown, Maryland.
Western Maryland College (now McDaniel College),
Westminster, Maryland, B.A. Mathematics.

Maria Nowak
La Jolla High School, La Jolla, California.
San Diego State University, San Diego, California,
B.S. Physics.
University of California San Diego, San Diego, California,
B.A. Theater.
Johns Hopkins University, Baltimore, Maryland,
M.S. Physics.

Lola M. Olsen
J. P. McCaskey High School, Lancaster, Pennsylvania.
Michigan State University, East Lansing, Michigan,
B.S. Biological Sciences.
University of North Carolina, Charlotte, North Carolina,
M.A. Geography.

Peggy E. O'Neill
Addison Trail High School, Addison, Illinois.
Northern Illinois University, College of Liberal Arts &
Sciences, DeKalb, Illinois,
B.S. Geography.
University of California, Santa Barbara, California,
M.A. Geography.

Melanie N. Ott
Wilde Lake High School, Columbia, Maryland.
Howard Community College, Columbia, Maryland,
A.S. Engineering.
Virginia Polytechnic Institute and State University,
Blacksburg, Virginia,
B.S. Electrical Engineering.
Virginia Polytechnic Institute and State University,
Blacksburg, Virginia,
M.S. Electrical Engineering.

Claire L. Parkinson
Montpelier High School, Montpelier, Vermont.
Wellesley College, Wellesley, Massachusetts,
B.A. Mathematics.
Ohio State University, Columbus, Ohio,
Ph.D. Climatology.

Lori Perkins
Towson High School, Towson, Maryland.
University of Dayton, Dayton, Ohio,
B.S. Computer Science.
Johns Hopkins University, Baltimore, Maryland,
M.S. Computer Science.

Wanda Peters
Duval High School, Lanham, Maryland.
University of Maryland Eastern Shore,
Princess Anne, Maryland,
B.S. Biology.
Catholic University of America, Washington, D.C.,
B.S.E. Biomedical (concentration: Mechanical).
George Washington University, Washington, D.C.,
Master of Engineering Management (M.E.M.).

Susanna Petro
Liceo Classico Francesco Vivona, Rome, Italy.
University Sapienza, Rome, Italy, Ph.D. Physics.

Barbara Pfarr
Bethesda-Chevy Chase High School, Bethesda, Maryland.
Smith College, Northampton, Massachusetts,
B.A. Astronomy and Mathematics.
Johns Hopkins University, Baltimore, Maryland,
B.S. Computer Science.

Jeannette Plante
South Carroll High School, Sykesville, Maryland.
Catholic University of America, Washington, D.C.,
Bachelor of Electrical Engineering (B.E.E.).

Chanda Prescod-Weinstein
Los Angeles Center for Enriched Studies,
Los Angeles, California.
Harvard College, Cambridge, Massachusetts,
A.B. Physics, Astronomy, and Astrophysics.
University of Waterloo, Waterloo, Ontario, Canada,
Ph.D. Theoretical Physics.

Diane Pugel
Star of the Sea High School,
Grosse Pointe Shores, Michigan.
University of Michigan, Ann Arbor, Michigan,
B.S. Physics.
University of Maryland, College Park, Maryland,
Ph.D. Physics.

Lorraine Remer
U. S. Grant High School, Van Nuys, California.
University of California, Davis, California,
B.S. Atmospheric Science.
University of California, Davis, California,
Ph.D. Atmospheric Science.

Jane Rigby
Seaford High School, Seaford, Delaware.
Pennsylvania State University, State College, Pennsylvania,
B.S. Physics, B.S. Astronomy and Astrophysics.
University of Arizona, Tucson, Arizona,
Ph.D. Astronomy.

Nancy Grace Roman
Western High School, Baltimore, Maryland.
Swarthmore College, Swarthmore, Pennsylvania,
B.A. Astronomy.
University of Chicago, Williams Bay, Wisconsin campus,
Ph.D. Astronomy.

Barbara L. Scott
Franklin High School, Reisterstown, Maryland.
Towson University, Towson, Maryland,
B.S. Mathematics.

Heather Shinn
Archbishop John Carroll High School,
Radnor, Pennsylvania.
Catholic University of America, Washington, D.C.,
B.S. Civil Engineering.
Drexel University, Philadelphia, Pennsylvania,
M.B.A., Concentration in Finance.

Amy Simon-Miller
Union High School, Union, New Jersey.
Florida Institute of Technology, Melbourne, Florida,
B.S. Space Science.
New Mexico State University, Las Cruces, New Mexico,
Ph.D. Astronomy.

Joanne Simpson
Buckingham School, Cambridge, Massachusetts.
University of Chicago, Chicago, Illinois, B.S. Meteorology.
University of Chicago, Chicago, Illinois,
Ph.D. Meteorology.

Maria M. So
Precious Blood High School, Hong Kong.
University of California, Berkeley, B.A. Statistics.
University of Calgary, Alberta, Canada,
M.S. Computer Science.

Teresa Spagnuolo
Foy H. Moody High School, Corpus Christi, Texas.
Texas A&M University, College Station, Texas,
B.S. Safety Engineering.

Cindy Starr
Harbor Creek High School, Harborcreek, Pennsylvania.
University of Kentucky, Lexington, Kentucky,
B.S. Accounting.
University of British Columbia, Vancouver,
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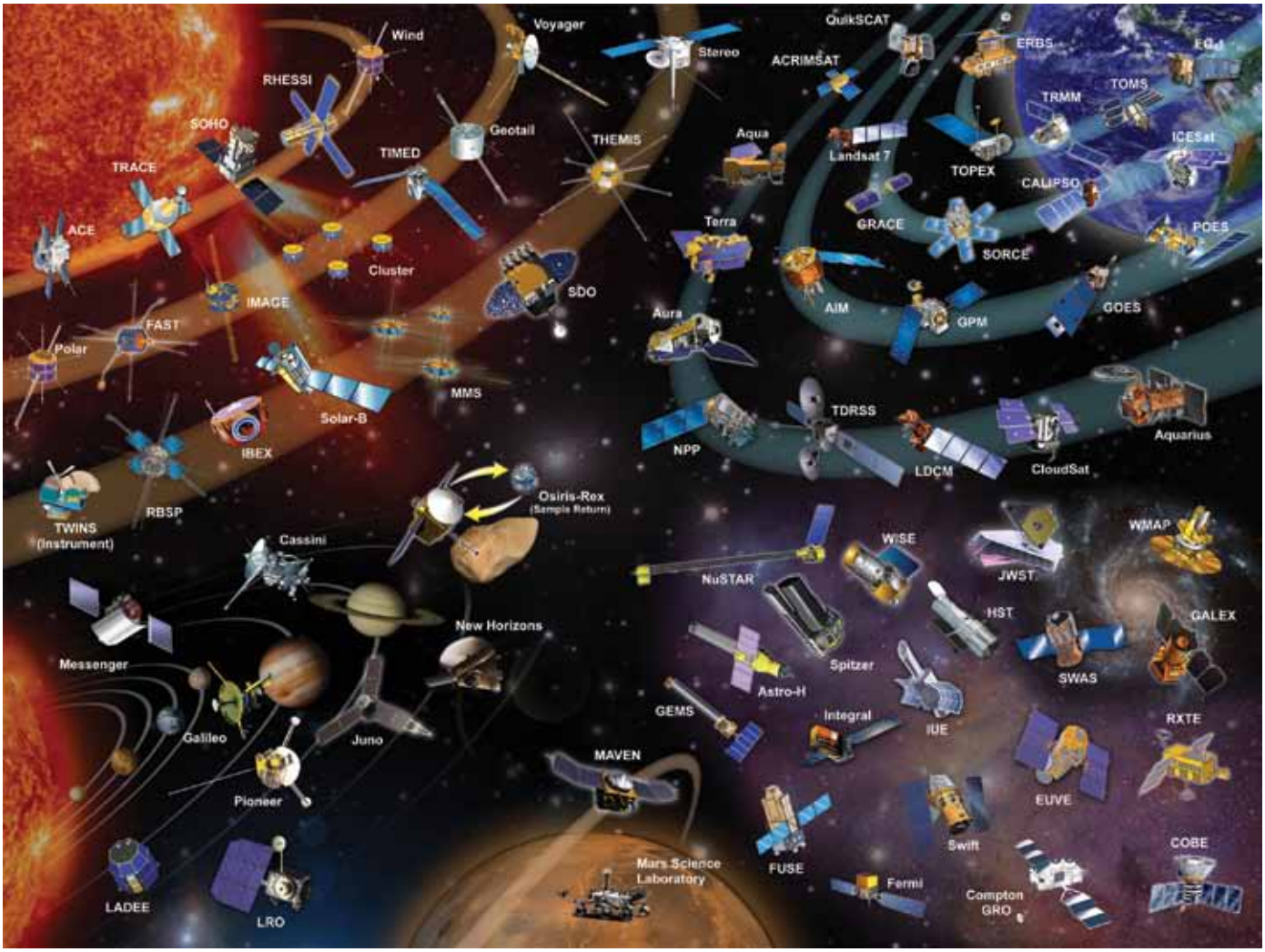
Degree Abbreviations:

A.S. – Associate in Science, or Artium Baccalaureus
B.A. – Bachelor of Arts
B.Eng. – Bachelor of Engineering
B.S. – Bachelor of Science
B.S.E. – Bachelor of Science, Engineering
D.Eng. – Doctor of Engineering
J.D. – Juris Doctor
M.A. – Master of Arts
M.B.A. – Master of Business Administration
M.S. – Master of Science
Ph.D. – Doctor of Philosophy

NASA's Commercial Orbital Transportation Services (COTS) launch vehicle being readied at Goddard's Wallops Flight Facility.



Schematic illustrating the many satellite missions with Goddard contributions, divided roughly to Sun missions in the upper left, Earth science missions in the upper right, space science missions in the lower right, and planetary missions in the lower left.

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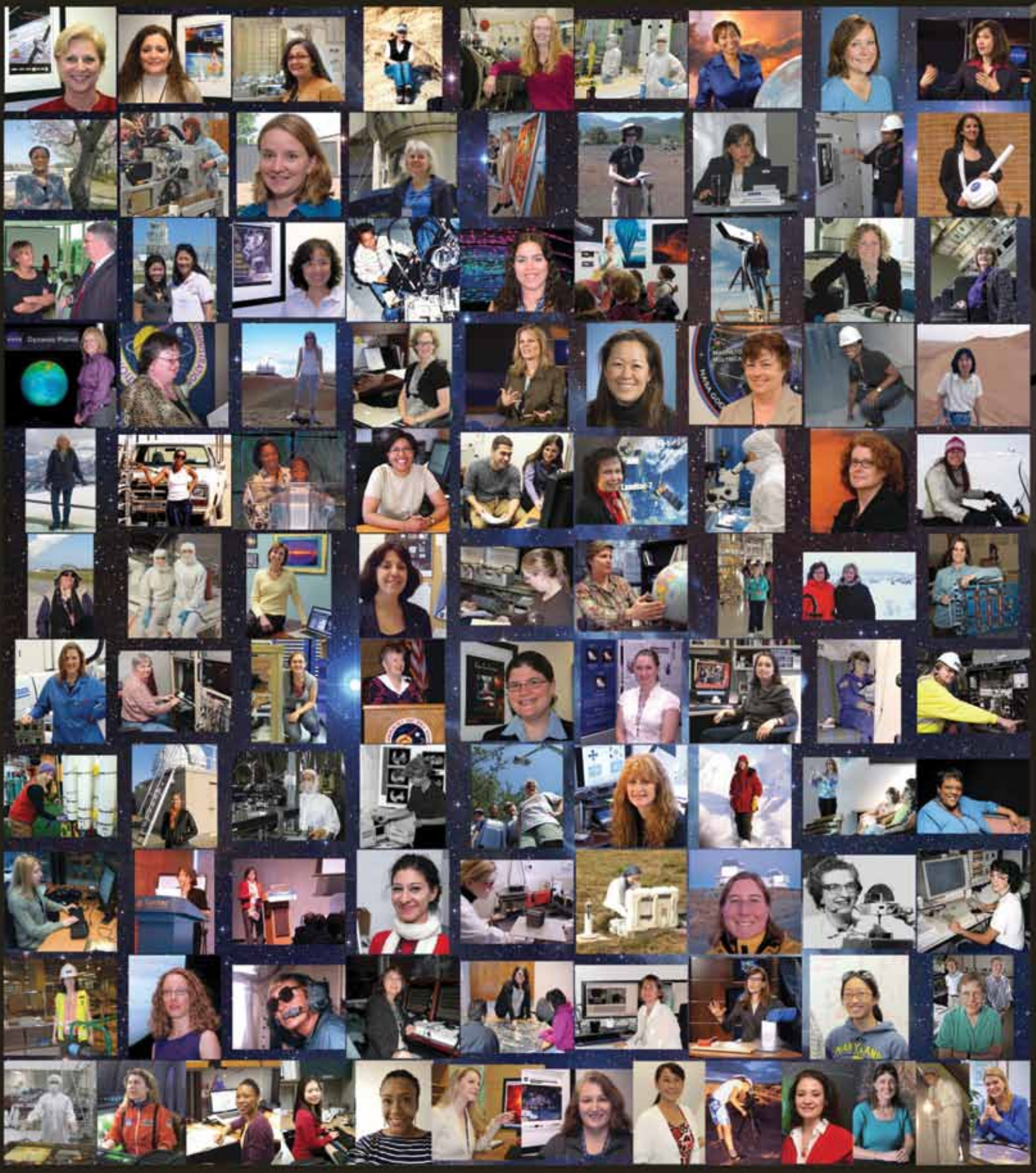

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