

goddardview

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NASA Administrator Visits Goddard

By Christina Coleman

On Thursday, July 29 NASA Administrator Charles Bolden attended a town hall meeting at Goddard to talk with NASA interns, fellows, and scholars about the importance of continued interest in science, technology, engineering, and math (STEM) careers.

Telling the crowd they are “the future of NASA,” Bolden addressed questions about keeping manned space flights relevant, creating stronger relationships with commercial space vendors, and keeping the fire ignited under space exploration.

“If you want to inspire a nation, tell them what you do,” he told the interns.

Bolden hopes to use education programs such as NASA’s One Stop Shopping Initiative (OSSI) to help graduate and undergraduate students submit one application for up to 15 educational opportunities.

Before Bolden’s session, NASA astronaut Leland Melvin and a Headquarters intern, Katelyn Duran, hosted a question and answer session with the interns. Melvin answered questions posed by Duran and members of the audience. ■



Photo credit: NASA/Goddard/Bill Hrybyk

Caption: Astronaut Leland Melvin and intern Katelyn Duran host the “pre-show.”



Photo credit: NASA/Goddard/Bill Hrybyk

Caption: NASA Administrator Charles Bolden answers a student’s question.

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Cover caption: “Milky J” (Bashir Salahuddin) dons his homemade spacesuit in an effort to save his beloved *Hubble*.

Photo credit: NASA/Goddard/Maggie Masetti

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“Milky J” Comes to Goddard to Save *Hubble*

By Katie Lilly

“Hubble Gotchu!” The hilarious catchphrase of *Hubble Space Telescope* fanatic Milky J, who has made several appearances on NBC’s Late Night with Jimmy Fallon showing off *Hubble*’s amazing celestial images “with force and fury.”

In his most recent debut on the “Late Night” show August 3, Milky J departs from his usual photo display. He admits to Jimmy Fallon and the studio audience that NASA has indeed chosen to begin phasing out the *Hubble Space Telescope* (HST) as its successor, the *James Webb Space Telescope* moves closer to launch. In reaction to this new information, Milky J reveals a dramatic music video showcasing his journey to the Goddard Space Flight Center where he vies to put an end to *James Webb* and save his beloved HST.

Rewind two weeks to the morning of July 22, when Milky J arrives at Goddard armed with his blue New York Yankees hat, matching homemade spacesuit, and “Late Night” entourage at his side. JWST Public Affairs Officer Lynn Chandler and JWST Video Producer Mike McClare led the charge in coordinating a jam-packed day of filming across the Center. The “Late Night” cast and crew, headed by director Michael Blieden moved from building to building, shooting scenes in the NASA Communications Center (NasCom), the Goddard TV studio, and in multiple locations throughout the building 10/15/29 complex.

Members of the JWST team were asked to lend their acting skills and technical expertise to the making of the video, many of whom revealed a surprising aptitude for comedy. JWST Optical Physicist, Brent Bos, was an audience favorite in his absurd rib eating scene at the NASA Communications Center. Bos recalls, “My favorite part about filming the rib scene was watching the ridiculous interactions between Milky J and my JWST colleagues in the control room. We can be involved in some pretty serious, high-consequence discussions at times, so it really made me chuckle when I saw what we were doing together.” Brent gave a hilarious performance, rapping a line from the song with rib sauce smeared across his face and grease stained letters in his hands. “My kids, who are eight, six, and four years old have been walking around the house saying, “Hubble Gotchu,” and asking me why I was so very hungry for those ribs” said Bos.

In a less slapstick but equally comical scene entitled “Milky’s Science Corner,” Milky J challenges JWST Observatory Manager, Paul Geithner, to try and explain why he believes JWST to be superior to *Hubble*. “Milky J’s unimpressed and dismissive responses to Paul’s JWST talking points are absolutely classic” said Bos. Paul Geithner’s role as the level-headed scientist elicited roars of laughter from the audience while explaining the viewing capabilities of the *Webb Telescope* when he closed his final argument by saying, “No, Hubble don’t Gotchu!”



Caption: Phil Driggers, Katie Lilly, Mike Menzel, Amber Straughn, and Ray Lundquist pose with “Milky J” (third from left).

“It’s fun to see the final product constructed from pieces of a whole day’s worth of taping” said Geithner “I think the sketch is great for NASA and huge for JWST because it exposes us to a broader, hipper audience.”

After losing his intellectual debate with Paul Geithner during the video interview, Milky looks as if he has lost hope in his mission, saying to HST model in the Visitor Center, “I’m not one to stand in the way of progress.” But in a moment of clarity, Milky renews his dedication to *Hubble* declaring, “You won’t pull us apart, no matter how good Webb is, *Hubble* got my heart!” In the video’s last scene, Milky takes his final stand against the *Webb* team by punching former JWST Instrument Manager, Phil Driggers and telling off the JWST crew.

In the end, Milky J departs Goddard without halting the JWST mission, but he does manage to harass some *Webb* employees, make a mess, and create a laugh out loud video.

Milky J, played by Bashir Salahuddin, is a writer on the Jimmy Fallon show, as well as a Harvard graduate and NASA enthusiast. During the World Science Festival in New York, Salahuddin had the opportunity to view the JWST model and meet Nobel Prize winner and JWST Lead Scientist, John Mather. Salahuddin and the “Late Night” crew jumped on the opportunity to film a sketch at Goddard alongside the *James Webb* team. The video has received great responses across the Center and from media sources including NBC and TV Guide.

To view the sketch, go to:

<http://www.latenightwithjimmyfallon.com/blogs/2010/08/hubble-got-nasa>.



Hubble Engineer Becomes a Knight

By Adrienne Alessandro

Dr. Edward Cheung, long-time Principal Engineer for the *Hubble Space Telescope* Development Project was recently dubbed Knight of the Royal Order of the Netherlands Lion. As an engineer who develops innovative electrical systems and solutions for the *Hubble Space Telescope* (HST), he has successfully mastered the art of blending new science and technology with outreach and inspiration.

His life reads like a fairy tale: young boy opens a box, discovers a challenging quest, and eventually receives knighthood for his many exploits and good deeds throughout the land. It began as a boy in Aruba, when he unfastened the screws to a radio. When he lifted off the cover to reveal a labyrinth of wires and circuitry, it revealed the components that “magically” made the sound. It was then he decided he wanted to be an electrical engineer. Education, he knew, was the path that would help him achieve his dream.

After studies at Colegio Arubano High School in Aruba and undergraduate work at Worcester Polytechnic Institute in Massachusetts, Cheung got a Ph.D. in robotics from Yale University and began a summer internship at NASA’s Kennedy Space Center. Recognizing that Goddard was emerging as a hub for building flight hardware, he moved to Greenbelt, Md. to be a part of the action.

In 1996, Cheung joined the *Hubble Space Telescope* Development Team and began work on such critical systems as the HST Orbital System Test and the Near Infrared Camera and Multi-Object Spectrometer cryogenic cooler. He continued to give guest lectures at schools and universities in Aruba.

However, it was not until the launch of the ASCS/NCS Relay Unit Breaker Assembly or “ARUBA” box on the *Hubble* Servicing Mission 3B in 2002 that his outreach efforts truly took flight. The device he so cleverly named after his country to generate public interest in technology and science captured the attention of the entire nation.

“It had a critical function to correct a fault that could compromise *Hubble*,” explained Cheung. “The crew would be handling and interfacing with this box during installation. They would say the word “Aruba” in space—perhaps for the first time.” The entire island watched and cheered when astronaut John Grunsfeld declared the installation of ARUBA on *Hubble* a success.

During the development of Servicing Missions 3A and 4 to *Hubble*, Cheung invited a camera crew from Aruba to come to Goddard and Kennedy to document the action in Aruba’s local language.

Throughout the years, his lectures and the productions he has coordinated have reached thousands of students and professionals, making him one of the island’s most celebrated sons.

In the midst of these milestones, Cheung is quick to shine the spotlight on the impact that NASA science and *Hubble*’s instruments have upon our understanding of the Universe. *Hubble* is an ambassador of science and technology to the entire world, he explains.

“Outside of the walls of a NASA Center, far away in a country like Aruba, NASA’s brand is very strong, and we have a lot to be proud of,” he said. “I want us to know that our work is important and that we should derive inspiration from that, just like many who are deciding their careers derive inspiration from NASA.” He continued, “We should always realize that what we do is a privilege; we should appreciate it and use it to work harder, and be vigilant to not tarnish that reputation.”

In recognition of his dedication to educating Aruba’s youth and his remarkable accomplishments on *Hubble*, on June 12, Queen Beatrix of the Netherlands conferred upon Dr. Cheung knighthood into the Order of the Netherlands Lion. This award, the highest civilian order in the Dutch Kingdom, was only conferred upon eight people in 2010. Sir Cheung’s honor marks the first time that the order has been awarded to a native-born citizen of Aruba.



Caption: Sir Edward Cheung (center) stands with Prime Minister Mike Eman (to Cheung’s right), Governor Fredis Refunjol (to Cheung’s left), and members of his family.

What was the first thing his daughter did when the family found out? She posted it on Facebook. They would later discover that a fortuitous mix-up with where the medal was initially sent bought Sir Cheung enough time to travel to Aruba with his family and siblings to receive the knighthood on the 50th anniversary of the founding of his high school.

“Looking at my kids, who are extremely keen on astronomy, makes me realize what an amazing legacy *Hubble* is,” he said. Knighthood will only strengthen his educational outreach efforts in his native land. ■

Replica of Nobel Prize Returned to National Air and Space Museum after Flight

By Christina Coleman

On Tuesday, July 27, 2010, the first ever Nobel Prize flown into space was returned back to the National Air and Space Museum (NASM) in Washington, D.C., where it will sit as a testimony to space exploration and the history of our universe. The medal was flown onboard space shuttle *Atlantis* on its final planned mission to deliver an Integrated Cargo Carrier and a Russian-built Mini Research Module to the *International Space Station*. STS-132 was the 32nd mission for *Atlantis*.

Passing through white gloves to prevent fingerprints and corrosives on the replica, Mission Specialist Piers Sellers, who was a scientist in the Laboratory for Terrestrial Physics at Goddard from 1982-1996, commended Dr. John Mather for his groundbreaking research of the Big Bang. Mather lead the *Cosmic Background Explorer* (COBE) team won the Nobel Prize in physics in 2006



Photo credit: NASA/Paul Albers

Caption: NASA scientist and Nobel laureate John Mather (center) and NASA astronaut Piers Sellers (right) present a replica of the Nobel Prize for Physics medal to John R. "Jack" Dailey (left) Director of the Smithsonian's National Air and Space Museum.

"When we did this, we discovered something about the beginning of the universe and therefore our own history, how human beings come to be able to live here on our planet," Mather said about his work with NASA's COBE mission, which studied the pattern of radiation from the first few instants after the universe was formed.

Nicholas White, the Director of Science and Exploration at Goddard, initially made the suggestion to Sellers that the replica be flown on space shuttle *Atlantis'* last flight with the STS-132 crew.

"I thought it was important because it was the highest achievement in science and it's good to take an example of space exploration. It was very symbolic and seemed to make sense."

Originally, Sellers requested that the replica held at NASA's Headquarters in Washington, D.C. be flown, but realized that the plastic encasement was too large to fly on *Atlantis*.

"It was the size of a coffee table," Sellers said.

Fortunately, a more portable replica of the medal was in the care of Margaret Weitekamp, a curator in the Division of Space History at NASM. She and her team worked tirelessly to get the medal to Sellers at a time when the entire city was handicapped by the February 2010 blizzard.

"This particular artifact is now much more significant because it's the only Nobel medal that has gone into space and come back. It's one of the few Nobel medals that are related to the space program and I'm the only NASA civil servant that has been a recipient," Mather said.

"We don't know what will come next but it is certainly a tremendous accomplishment for our Agency and a great item of pride for everyone that worked on the project."

After the medal was returned, the STS-132 crew talked to a group of students from NASA's Summer of Innovation program, meant to stimulate science, technology, engineering, and mathematics careers, about their last mission to the International Space Station.

"I think that science is fun, science is interesting. It's good for the kids to see science with real people," Sellers said about talking to the students. "When I was a kid, I really didn't know what scientists did day to day, how they spent their time, and the more we can show kids that, I think that it peaks their interest and encourages them to study more." ■

STS-132 Crew Visits Goddard

By Amy E. Pruett. Photos by Pat Izzo

On Thursday, July 29, the NASA Astronauts of the STS-132 crew shared their spaceflight experiences during a visit to Goddard. The crew recounted the adventures of their 11-day mission, as well as awarded two Goddard employees the prestigious Silver Snoopy Award of NASA's Space Flight Awareness program. ■



Caption: NASA Astronaut Piers Sellers and NASA Astronaut Michael Good (left to right) make final preparations before awarding Silver Snoopies to Goddard employees Richard Brown and Dr. Lisa Mazzuca. The Silver Snoopy Award, also known as the astronaut's personal award, recognizes NASA civil servants and contractors who have provided exemplary support of NASA's Human Spaceflight Programs.



Caption: The STS-132 crew flew the final scheduled flight of Space Shuttle Atlantis, its 32nd launch and landing, and the 34th visit by a Shuttle crew to the International Space Station. From left to right, the members were Kenneth T. Ham (Commander), Dominic A. Antonelli (Pilot), Garrett E. Reisman (Mission Specialist), Michael T. Good (Mission Specialist), Stephen G. Bowen (Mission Specialist), and Piers Sellers (Mission Specialist).



Caption: Rob Strain, Center Director for Goddard, welcomes the STS-132 crew to Goddard. NASA Astronauts Piers Sellers and Michael Good are familiar faces to the Goddard community as both have previously worked or trained at the Center. Astronaut Sellers was a scientist in the Laboratory for Terrestrial Physics between 1982 and 1996. Michael Good was a mission specialist on the fifth and final Hubble servicing mission, STS-125, and visited Goddard frequently while training for the mission that launched in May 2009.



Caption: NASA Astronaut Piers Sellers "snoops" Silver Snoopy Award recipient Richard Brown. Tradition states that awardees are to be declared to have been "snooped" after a NASA Astronaut pins them with their sterling Silver Snoopy pin.



Caption: Dr. Lisa Mazzuca stands with NASA Astronaut Michael Good after receiving her Silver Snoopy Award certificate. The presentation of the pin flown on STS-125 to Dr. Mazzuca was especially poignant as she was recognized for uncompromising dedication to the Hubble Space Telescope Servicing Mission 4, STS-125. Good especially enjoyed awarding Dr. Mazzuca, as he was a Mission Specialist on STS-125, Hubble Servicing Mission 4.

STS-132 Crew Visits Goddard



Caption: Following the Silver Snoopy Award presentations, Commander Kenneth T. Ham recounts the accomplishments of his crew during their 11-day mission that launched aboard Space Shuttle Atlantis on May 14, 2010 from the Kennedy Space Center in Cape Canaveral, Fla. The crew delivered an Integrated Cargo Carrier and a Russian-built Mini Research Module to the International Space Station.



Caption: After some good-natured ribbing from his crewmates, Michael Good, one of Goddard's favorite astronauts, having trained at Goddard for his role in Hubble Servicing Mission 4, got his chance to talk about his return to space.



Caption: A career as an Astronaut requires more than hard work and dedication; a sense of humor is key. Astronaut crews train for two years in preparation for their mission, often working together for long hours in stressful circumstances. A momentary break in focus during a critical task could produce disastrous results. So, in the down time, having a little fun is more important than you'd think. This image of the crew, in "Rat Pack" mode, shows that the STS-132 Crew can get the job done, but also enjoy a laugh along the way.



Caption: Michael Good relates his emotional experience at the end of one of his spacewalks during STS-132. Upon entering the payload bay of Space Shuttle Atlantis, the location brought back memories of his first shuttle flight, when he was one of six individuals servicing the Hubble Space Telescope.



Caption: In addition to completing their assigned mission, the STS-132 crew took time to document their experience with imagery. Here, Dominic A. Antonelli shares an image he captured during one of the 16 sunrises and sunsets they saw each day while in orbit.

The Mysterious Roving Rocks of Racetrack Playa

By Elizabeth Zubritsky

In a particularly parched region of an extraordinary planet, rocks big and small glide across a mirror-flat landscape, leaving behind a tangle of trails. Some rocks travel in pairs, their two tracks so perfectly in synch along straight stretches and around curves that they seem to be made by a car. Others go freewheeling, wandering back and forth alone and sometimes traveling the length of several football fields. In many cases, the trails lead right to resting rocks, but in others, the joyriders have vanished.

This may sound like an alien world, but it's actually Racetrack Playa in Death Valley, Calif. Since the 1940s, researchers have documented trails here and on several other playas in California and Nevada. Seventeen undergraduate and graduate students from the Lunar and Planetary Sciences Academy (LPSA) at Goddard traveled to the Racetrack and nearby Bonnie Claire playas this summer to investigate how these rocks move across the nearly empty flats.

"Around you is hot white cracked clay in all directions (you're spinning to take it in)," wrote intern Emma McKinney of the Massachusetts Institute of Technology in Cambridge, Mass., in the blog for the LPSA trip. The mountains that hug both sides of the playa are so distant they look "like the backdrop to an old western [movie]. . . . No one speaks because they are a what-seems-to-be-a-million-miles-away-distance from you."

Nobody has actually seen a rock in motion, and scientists haven't deduced exactly how it happens. The easy explanations—assistance from animals, gravity, or earthquakes—were quickly ruled out, leaving room for plenty of study and irresistible speculation over the years.

"When you see these amazing rocks and trails," says Mindy Krzykowski, an intern from the University of Alaska in Fairbanks, "you really get into coming up with your own ideas about what's going on."



Caption: Panoramic view of rocks and trails. The trails in the center are parallel, even turning together. Not every trail has a rock, adding to the mystery.

A Treasure Hunt

Sporting sunhats and carrying lots of water, the students arrived on the playa early for their day of data collecting. They broke into five teams, led by Cynthia Cheung, the LPSA principal investigator, and other Goddard staff members. The teams took out their maps, packed their equipment, and headed in different directions in search of rocks and trails. "It felt like a treasure hunt," says intern Justin Wilde from the University of Wyoming in Laramie.

For each rock and trail, the students recorded GPS coordinates and snapped photos. They dug up small sensors called Hygrochrons that had been buried (with the required permission of the National Park Service) three months earlier by Gunther Kletetschka, one of the trip leaders. Temperature and humidity data, stored electronically in the Hygrochrons, was captured. The interns marked trail boundaries by slipping colored pushpins into cracks in the clay and measured each track's length, depth, and width. They confirmed earlier observations that some of the big rocks have moved farther than the small ones.

The students checked for unusual or changing magnetic fields. (No evidence of that.) One student conducted radiation measurements. (Nothing strange there, either.) They pulled out small levels to determine if the trails might be tilted downhill. (Nope, Racetrack Playa rises only about an inch over its 4-1/2 mile length.)

The plethora of data is needed because "what's happening on Racetrack Playa is subtle and complicated. It's not obvious right away which data is going to be important," says Brian Jackson, one of the trip leaders and co-author of a paper comparing the site to a dry lake bed on Saturn's moon Titan.

Some of the rocks that have moved weigh less than a pound, but many are 25–30 pounds. One of the largest sliders has been estimated at 700 pounds. A powerful force is required to move rocks that big, and the obvious candidate is the fierce playa wind. "It's surprising when you see how big some of these boulders are," says intern Andrew Ryan of Slippery Rock University in Slippery Rock, Penn. "You think, 'How can something that big get blown around?'"

The winds that graze the playa's surface are very fast, but they don't reach the speeds of 150 miles per hour or more that would probably be necessary to move most of the rocks. So, newer studies tend to ask how the friction between the rocks and the clay might be reduced.

One answer is that the playa's top layer of clay transforms into a slick film of mud when the surface gets wet. Algae may lie dormant in the dry clay and bloom when the surface wets, further reducing the amount of friction. The students performed water-absorption experiments at Bonnie Claire Playa and confirmed that the clay does get slippery. Even so, the students concluded that most rocks could not move without other help.

Photo credit: NASA/Goddard/Maggie McAdam

The Mysterious Roving Rocks of Racetrack Playa

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The aid probably comes in the form of ice. In this high desert, winter brings snow to the mountains, and the meltwater washes downhill and collects in huge, shallow pools that spread across the playa and freeze at night. Decades ago, researchers proposed that big sheets of ice might envelop clusters of rocks, then catch the wind and drag the rocks around together. This could explain the cases in which two tracks run perfectly alongside each other.

But results published in 1976 showed that this doesn't happen in all cases. More recently, it's been thought that collars of ice can form around the lower parts of the stones, probably because the mass of a rock retains the cold. When more water moves in, the collar helps the rock partially float, so even a heavy rock might slide when the wind blows. The presence of ice collars could explain why some trails start narrow and get wider: the rock gradually sinks into the wet clay as its icy lifejacket melts away.

Data from the Hygrochron sensors provided evidence that conditions are right to form ice collars. Temperatures just below the surface dipped to freezing in March, and the soil about 3 inches down was wet almost continuously in March and April.

Kletetschka is coordinating a research paper by the group that will present these and other data and will suggest a slightly different mechanism for the rock movement. The rocks are still thought to be collared by ice, but the group has identified a new parameter that is critical in explaining why it is so easy to move the rocks and create trails. The paper will give the details, but the finding means that the wind speed doesn't have to be as great to move the rocks. "This idea would also explain the trails that don't have rocks," Kletetschka says. "The trails were made by rocks whose larger parts were made from ice."

Problems Still to Solve

Some students want to keep working on the Racetrack Playa mystery after the internship. Ryan, an environmental science major, devised a test bed packed with mud from Bonnie Claire Playa that can be used to probe whether ice collars can form and make rocks buoyant under controlled laboratory conditions.

Leva McIntire from Seattle Pacific University has her own hypothesis: that the rocks are moving by regelation, a process usually associated with glaciers and mountains. Regelation is caused by a difference in pressure on

the two sides of an object, and she says that bubble-like formations found in the clay next to some rocks could be evidence of it. "This theory might explain how the big rocks move," she says, "because it does not require floatation of the rocks."

In addition to the field work conducted at Racetrack Playa, the LPSA interns worked individually or in small groups with mentors at Goddard on a wide range of active research projects in earth and planetary sciences. They presented their results in talks and posters and held an online event, coordinated by Goddard's Maggie McAdam, to discuss their NASA experiences with roughly 450 kids in Boys and Girls Clubs of America nationwide.



Photo credit: NASA/Goddard/ Leva McIntire

Caption: The LPSA interns and trip leaders at Tea Kettle Junction in Death Valley, Calif. (Standing on left side, left to right): Kristopher Schwebler, Valerie Fox, Emily Kopp, Kyle Yawn, Dan Burger, Ian Schoch, Devon Miller; (left to right, sitting) Justin Wilde, Jessica Marbourg, Maggie McAdam (a trip leader), Leva McIntire, Ann Parsons (a trip leader), Mindy Krzykowski, Emma McKinney, Cynthia Cheung (LPSA principal investigator and a trip leader), George Fercana; (standing on right side): Kynan Rilee, Gregory Romine, Clint Naquin, Gunther Kletetschka (a trip leader), Andrew Ryan, and in the very back, Brian Jackson (a trip leader).

"I came to the program liking engineering," notes Wilde, a chemical engineering major whose project explored possible pathways for forming water on the Moon. "But I found the planetary research very enjoyable because I had so much liberty in my work."

"I've always been interested in the formation of stars and planets, and here, I've seen that there are still tremendous opportunities for research," says Krzykowski. "Not all the problems in planetary science have been solved."

Read the trip blog and see photos by the LPSA interns at: <http://lpsadeathvalleyexcursion.blogspot.com>. ■

OutsideGoddard: The Adventures of Marathon Man

By Elizabeth M. Jarrell

For Bill Wrobel, Director of the Wallops Flight Facility, “All of life is an adventure. A marathon is just a running adventure.” Growing up in rural Ohio, he often wondered what the rest of the world looked like. Now he knows. He is about to be inducted into the elite Seven Continents Club that only admits those who have run marathons on all seven continents defined as North America, South America, Europe, Asia, Africa, Oceania (including Australia and New Zealand), and Antarctica.

Although Wrobel always played sports, he hated track in high school. He took up running after he turned 40 because, says Wrobel, “Age catches up with you in terms of contact sports and I didn’t know what else to do. Running was a good way to clear my head.” Shortly after the birth of his triplets, a fellow engineer asked him to run a marathon, which is 26.2 miles. They targeted the hilly Pittsburgh Marathon. Wrobel says, “I always wanted to do one but didn’t know how to do it. I had no idea how to prepare for a marathon.” They found an article in a running magazine which detailed a week by week training regime. Explains Wrobel, “Every week you ramped up in terms of miles. Once you get to 20 miles, you’re good to go.” Each week, he now usually runs one long 13 mile run on Sunday; two, eight mile runs on Tuesday and Thursday; and one short five or six mile run on Wednesday. He also cross-trains for an hour on off days by biking, lifting weights, or swimming. It takes about three months to prepare for a marathon. Wrobel approaches marathons as a mental and physical game.

He did not pay much attention to equipment for his first marathon. He bought running shoes from a local store, regular socks, and old-school cotton clothes. Now he buys shoes specially fit to accommodate how he walks and socks and clothing made out of moisture wicking materials. Wrobel says that “I got more particular about my clothes as I got on. Even chafing of a shirt can make bare or even bloody spots over time.” He now uses a skin protectant which helps protect against chafing. “Chafing’s bad,” says Wrobel. Also, wet cotton gets heavy. After running a while in the rain, you pick up about ten pounds.” The gear is not expensive and packs easily. Each pair of shoes lasts him about 300 miles. He brings a backup pair for marathons and never wears new shoes in marathons.

The night before a race he eats a big spaghetti dinner. The morning of the race he eats bananas and bagels with orange juice. During the race he ingests gel packs of carbohydrates and drinks water. He does not take any special vitamins.

Wrobel and his colleague completed the Pittsburg Marathon in October 2001. Says Wrobel, “After that race, I could not believe how sore I was. I needed a cane just to step off the street curb. I never wanted to do another marathon again.” A fellow marathoner advised him to run one mile the day after the marathon to reduce the lactic acid built up in his muscles, a regime that he follows after each marathon. Wrobel explains that “it’s not pretty and it hurts like the dickens, but it makes a huge difference.”

In November 2004, Bill’s work required him to go to Taipei, Taiwan for several weeks. He had just started some of his long runs and he continued running in Taipei, using his GPS since he could not ask for directions. In early December 2004, he noticed that a marathon was being set up across the street from his hotel. He got a “Day of” running pass which authorized him to participate in a smaller run. Wrobel says, “I figured that Asia is one of the continents. If I’m here, I’m going to do the whole marathon.” He was not well prepared. He was not yet up to a full marathon length, he did not have his normal equipment, and did not have any skin protectant to minimize chafing. After the race, he was a self-described wreck. His socks were pink with blood which had run down his body due to chafing. “It wasn’t much fun, but I got it done,” says Wrobel. By February 2005, he had run on four different continents.

In 2003, two colleagues wanted to run a marathon in Antarctica. Wrobel did not want to go at first but, as he puts it, “Time heals all wounds.” His wife was used to him traveling about 1 ½ weeks out of each month anyway; however, he still wanted her approval. Wrobel asks, “How do you sell the whole Antarctica thing to your wife? We talked about it until she stopped looking at me sideways. That was the hardest part.” She finally agreed.

Although he was waitlisted at first, he eventually got in for the February 2005 marathons both in Antarctica and in nearby Ushuaia, Argentina, which is the southernmost city in Argentina and therefore counted as South America. “Once we got into Antarctica and South America, we decided that we may as well do all seven continents,” explains Wrobel.



Caption: Bill Wrobel hits the trunaround with a smile on his face.

Photo provided by Bill Wrobel

Wrobel and his colleagues selected the Italian Skyrace through the Italian Alps in July 2006 for their fifth continent marathon. According to Wrobel, “By that point, our families had put up with a lot. We wanted to take our families to Europe in the summer. The Italian Alps are gorgeous. Also, it’s not possible to find a marathon in the lower country because many Europeans are also on vacation during the summer.” Wrobel’s routine became traveling about two and one half weeks for each marathon trip. He says, “It’s all part of

OutsideGoddard: The Adventures of Marathon Man

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that adventure thing. The race is just a part of it.” He spent about five days acclimating to the area, ran the marathon, and spent the remaining time enjoying the area with his family and friends.

Despite having practiced by doing long runs through the Appalachian Trail, Wrobel says, “This run was terrible because of the elevation issues. I didn’t get sick but somehow we made a wrong turn so this marathon took forever – 11 hours. We could have walked it in 11 hours. It was tough and we were a mess by the end.” Although he had a GPS, it only showed the beginning and end of the course, not the actual course. The marathon organizers sent out a search party because they took so long to complete the run. Remembers Wrobel, “Our wives were genuinely glad to see us, and that we had not perished. This was the toughest marathon to date. They all have something a little bit different.”

In July 2008, Wrobel and his friends ran their sixth continent marathon in Knysna, South Africa, an area famed for safaris. “This one was just a lot of really big hills with steep inclines and steep declines. It was pleasant. The temperature was good.” They saw baboons and elephant droppings along the way.

Wrobel and his colleagues ran their seventh and final continent marathon in March 2010 in New Zealand. Says Wrobel, “This was the most beautiful marathon, but it was one of the toughest courses because we had about 30 water crossings. One mile in, I was up to my knees in cold water. But by late afternoon, it felt good and cool to go through the water. It was a tough finish. We ran at least half a mile in very cold water between the ankles and the knees. It’s probably good for muscles but not conducive for good racing conditions. My feet felt like blocks of ice”

Wrobel’s ten-year quest to run marathons on all seven continents is now completed. He still runs three times a week and up to seven to eight miles a run. He may find more adventurous runs to replace several that he already did. “More adventurous marathons are a neat way to see the countryside instead of just the city,” explains Wrobel. He is contemplating running the Bataan Memorial Death March through the desert near Los Cruces, New Mexico as an alternative to the Pittsburgh Marathon. He may also substitute the Mount Everest Marathon or the Great Wall of China Marathon for the one he did in Taipei, Taiwan. Additionally, he may try to complete an Iron Man, which includes a 2 ½ mile swim, a 112 mile bike, and a marathon.

Reflecting back, Wrobel notes that “running gives you a lot of time to think. I think about all kinds of things.” His favorite marathons were Antarctica, South Africa, and New Zealand because, he says, “They were all beautiful in different ways.” For Wrobel, “These marathons aren’t about the time you race, they’re about the adventure. Besides, I am not a very good runner anyway. But running is a great way to see a variety of things. In 26.2 miles, you’re going to come across interesting stuff no matter where you are. I’ve always liked to see what’s out there and this was a great way to do it.” ■

Goddard Intern Poster Session

Pictures by Bill Hrybyk

On July 28, summer interns from across the Center gathered in the Building 28 atrium for the annual poster session. Poster topics ranged from marketing proposals to excursions to Death Valley. Interns explained their posters to guests and shared what they learned during their time at Goddard. ■



Summer Intern from Puerto Rico Has Sunny Perspective

By Susan Hendrix

Growing up in the remote town of Gurabo, Puerto Rico, Wanda Díaz-Merced and her sister dreamed of flying the Space Shuttle. They would spend hours in her sister's room pretending to visit distant galaxies.

This pretend game provided Wanda and her sister, who both have physical disabilities, an escape from reality. As a child, Wanda also became proficient at tackling challenges head on.

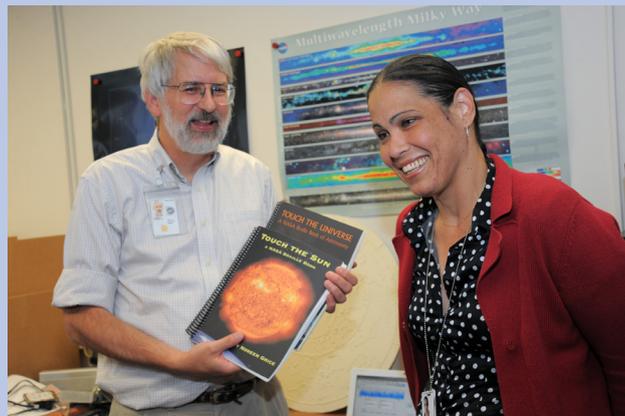
She became a stronger, more confident person, learning quickly to persevere and push herself. She recalls winning second place in a middle school science fair and thinking "Wow! I can do this." She dove into math and science.

Her studies led her to Goddard in 2005, under a program called Achieving Competence in Computing, Engineering, and Space Science (ACCESS). The following year, she applied for and was accepted in a NASA program called Summer Institute in the Engineering and Computer Applications (SIECA).

Wanda insists she is not smarter than anyone else. "I have to study, study, study. I am very determined. If I can do it (science), anyone can. No excuses."

Today, Wanda may still find her feet firmly planted on the ground, but she is exploring the solar system in a very unique way. For the past five years, she has been an intern at Goddard's Heliophysics Division where she uses sound to analyze the solar wind.

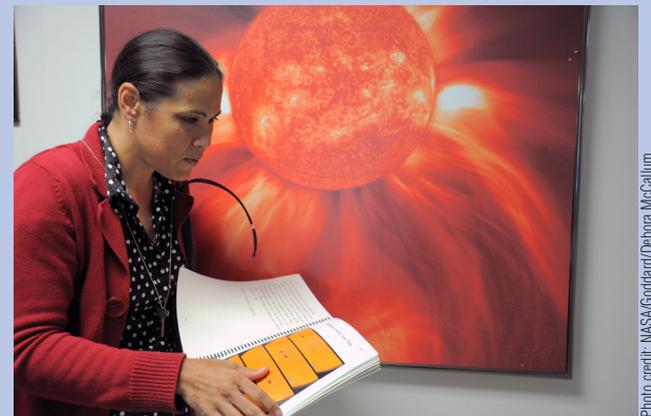
This year, Wanda is conducting research on cataclysmic stars using sonification techniques. She developed these techniques under the mentorship of Goddard computer engineer Bobby Candey in the Heliophysics Laboratory and University of Glasgow professor Stephen Brewster. Sonification research is the intuitive audio representation of complex, multidimensional scientific data.



Caption: Wanda and her Goddard mentor Bobby Candey.

Using Human Computer Interaction, the basic goal of which is to improve the interaction between users and computers by making computers more usable and receptive to the user's needs, Wanda conducts experiments to see if sonification techniques she developed, together with visual perception, can enhance the quality and amount of signatures from the data provided. A Harvard-Smithsonian grant, given by the Women in Science Committee at the Smithsonian, facilitates her research.

Her sonification programs undergo rigorous review by an independent researcher. Wanda's approach is simple, "People approach knowledge in different ways. This approach, using sonification, will widen the number of people who can access the data."



Caption: Wanda holding "Touch the Sun," a book with colorful raised images and combined text in print and Braille that explores the dynamic nature of the Sun.

Currently a Ph.D. candidate at the University of Glasgow in Scotland, Wanda is pursuing a Computer Science degree and plans to defend her dissertation next spring.

Recently, Wanda was one of only seven students selected by Google to win the company's first annual European Scholarship for Students with Disabilities. The scholarship recognizes outstanding Ph.D. students doing exceptional research in the field of computer science.

The winners of the Google scholarship were treated to a surprise, all expenses paid retreat to Googleplex in Zurich in June. "It was a very magical experience," Wanda remarked.

In her spare time, Wanda enjoys developing lesson plans and visiting schools to "bring the world of astrophysics to students of all ages." When asked what advice she would give to other girls who may lack confidence due to a physical disability, Wanda said, "Never give up on your dreams. Give yourself the chance of a lifetime. Anyone with dedication, discipline, and a good heart can reach their goal." ■

Photo credit: NASA/Goddard/Debra McCullum

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