

National Aeronautics and Space Administration



Goddard View

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GoddardView

TRENDING



NASA Scientists Speak During a Screening of "The Martian"
The National Geographic Society in Washington, D.C., hosted a screening of the science fiction film "The Martian" on Sept. 29. NASA scientists discussed the film alongside Ridley Scott, the film's director, and actor Chiwetel Ejiofor.

Asteroid Sample Return Mission Begins Environmental Testing
Over the next five months in Lockheed Martin facilities near Denver, the OSIRIS-REx spacecraft will undergo tests that simulate the vacuum, vibration and extreme temperatures that it will experience during its mission.



Panel Discusses NASA's Journey to Mars
On a panel moderated by Goddard Chief Scientist Jim Garvin, five of the center's scientists and engineers discussed how they are contributing to the agency's goal of sending humans to the Red Planet by the 2030s.

AAPD Officer Delivers Message on Disability Employment
Michael Murray, chief operating officer of the American Association of People with Disabilities, delivered the keynote address for Goddard's observance of National Disability Employment Awareness Month.



GoddardView

- Trending – 2
- Following Father's Footsteps: South Korean Leader Visits a NASA Center – 3
- Goddard Engineer Strikes a Chord – 4
- Alexei I. Lyapustin: Fearlessly Tackling Scientific Problems – 5
- Annual Museum Lecture Encourages Exploration of 'Our Violent Universe' – 7
- Record Crowd Comes Out to Explore Goddard – 8
- Explore@NASAGoddard: More Than 20,000 Strong – 10
- 'Urinetown' Brings Scientific Satire to Bathroom Breaks – 12

On the cover: Children handle the switches in the Goddard television control room during the Explore@NASAGoddard open house.

Photo credit: NASA/Goddard/Debra McCallum

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GoddardView Info

Goddard View is an official publication of [NASA's Goddard Space Flight Center](#) in Greenbelt, Maryland. Goddard View showcases people and achievements in the Goddard community that support the center's mission to explore, discover and understand our dynamic universe. [Goddard View](#) is published by the Goddard Office of Communications.

You may submit story ideas to the editor at darrell.d.delarosa@nasa.gov. All contributions are subject to editing and will be published as space allows.

CONTENTS



FOLLOWING FATHER'S FOOTSTEPS: SOUTH KOREAN LEADER VISITS A NASA CENTER

By [Darrell Dela Rosa](#)

Keen on advancing his country's scientific capabilities, then-President Park Chung-hee of South Korea paid a visit to NASA's Kennedy Space Center in 1965. Fast forward half a century, and the country's leader makes another visit to NASA. Only this time, the president is his daughter, and her destination was NASA's Goddard Space Flight Center.

Greeted by Center Director Chris Scolese and Maryland first lady Yumi Hogan – who is of Korean descent – President Park Geun-hye arrived at Goddard on Oct. 14 as part of a four-day trip to the United States. Her visit to Goddard is the first by a sitting head of state since Queen Elizabeth II of England made her way to the center in 2007.

"Being able to talk to a head of state is really important, because that allows us to highlight what we do together and encourage greater collaboration," Scolese said.

Astronaut Scott Kelly, the current commander of the International Space Station, welcomed Park with a personal video message from space. Goddard Chief Scientist Jim Garvin and Lunar Reconnaissance Orbiter Deputy Project Scientist Noah Petro then proceeded with hyperwall presentations about NASA's journey to Mars and LRO, respectively.

For its part, South Korea plans to launch a lunar orbiter and moon probe by 2020. The lunar exploration mission would come just seven years after it successfully launched the Naro carrier rocket – the country's first-ever spacecraft to reach orbit – in 2013.

"Our two countries are currently engaging in collaboration and cooperation in terms of lunar exploration," Park said. "I think we can look forward to further expanding our cooperation so that this can enhance our respective capabilities in terms of space exploration."

After listening to overviews of some of the center's latest projects and programs, Park toured the Goddard Satellite Servicing Capabilities Office with a group led by Benjamin Reed, SSCO deputy project manager. She was given the opportunity to operate one of the facility's robotic arms alongside Brian Roberts, robotic operations manager.

Fascinated by her experience, Park asked about potential synergies between the space programs going forward.

"We're collaborating in a lot of areas such as Earth science and technology, and we can do a lot more together," said Scolese, referring to possibilities in climate and weather analysis, telescope operations, and robotics.

Less than four years removed from her country's first foray into space, Park hopes her visit will help serve as a catalyst for future Korean advances in exploration.

"I hope young people from Korea and the United States can really interact frequently so that they can together nurture their dreams, passion and drive to challenge the new frontiers of space," she said.

Fifty years have passed since her father made a visit to a NASA center, and much progress has been made over the decades, but Park remains well aware of Goddard's past success and its role in discoveries to come.

"I know that Goddard is NASA's first spaceflight center. It embodies the history of space exploration. It serves as the part to unlocking the dreams for greater space exploration in the future," Park said to her hosts. "I think it's very significant that I was able to find the time to come here." ■

Above: Center Director Chris Scolese (left) welcomes President Park Geun-hye of South Korea.

Photo credit: NASA/Goddard/Bill Hrybyk



GODDARD ENGINEER STRIKES A CHORD

By [Clare Skelly](#)

On Sunday afternoons in the fall, most football fans watch NFL games from the comfort of their living rooms. Mark Neuman, meanwhile, watches every Baltimore Ravens home game from just behind the end zone. With his purple electric guitar in tow, Neuman and three other musicians make up the electronic rhythm section of the team's 150-member Marching Ravens.

Being a part of the largest musical organization associated with the NFL is Neuman's side gig. During the workweek, he is a mechanical engineer at NASA's Goddard Space Flight Center. Together, his two jobs make a unique duo.

Neuman has worked on both human and robotic servicing missions at Goddard for nearly three decades. He was a part of the Hubble Space Telescope servicing team for 20 years, developing carriers to hold instruments during servicing missions. "We would design the hardware and eventually teach astronauts how to use it," Neuman said.

He is currently the lead systems engineer for the Robotic Refueling Mission. An external payload on the International Space Station, RRM uses Dextre – a Canadian-built dexterous robot – to demonstrate robotic refueling and servicing for satellites. "I get to see the flow of a project life cycle through each of the different phases," Neuman added. "I get to be a part of each step and see the end result."

RRM engineers orchestrate the robot's programming to refuel sealed fuel caps on satellites. This entails fine-tuning the timing of approach and sequence of commands. The same tasks apply to music, according to Neuman.

"Similar to solving problems within the framework of engineering principles and available design space, playing music lets me create something new within the framework of tempo, dynamics and key signature," he said.

Neuman started playing guitar in high school, and although his formal music education only lasted three years, he developed his skills by playing in bands.

This is Neuman's third season playing guitar for the Marching Ravens. A Ravens fan himself, Neuman enjoys entertaining other fans on game days. "Adding some guitar-driven rock music has been very well received by the crowd," said Neuman. "The fans tell us to 'keep rocking.'"

Only two NFL teams have full marching bands (the Washington Redskins being the other), and the Ravens are the only one with an electronic rhythm section. The foursome – two guitarists, a bassist and a drummer – plays anything it chooses at the end of the third quarter. Before the game and during halftime, it joins the rest of the Marching Ravens on the field to play anything from Elvis Presley to Fall Out Boy and, of course, "The Baltimore Fight Song."

Neuman acknowledges that playing in front of 70,000 people at M&T Bank Stadium sometimes feels overwhelming. "To stay in the zone, I focus on what I am doing and not on how many people are watching and listening," he said.

In addition to rocking out on Sundays, Neuman plays guitar with Out of Order, a local band he started with college friends. They cover '80s rock and play at local restaurants and venues such as the Columbia Lakefront in Maryland.

Between RRM, two bands, as well as his wife and four kids, Neuman keeps a busy schedule. "The opportunity to play in front of a stadium full of people is a dream come true, so I had to find time to fit it in," Neuman said. ■

Above: Goddard mechanical engineer Mark Neuman (left) playing electric guitar with the Marching Ravens. Bandmates include Tobias Hurwitz on guitar (center), Rich Snyder on bass (right) and Andy Davis on drums (rear).

Photo credit: Baltimore Ravens/Shawn Hubbard

ALEXEI I. LYAPUSTIN: FEARLESSLY TACKLING SCIENTIFIC PROBLEMS

By [Elizabeth M. Jarrell](#)

Alexei Lyapustin takes the air out of things, for science!

What do you do and what is most interesting about your role here at Goddard?

I am a principal investigator for the Moderate Resolution Imaging Spectroradiometer, Visible Infrared Imaging Radiometer Suite and the Earth Polychromatic Imaging Camera of the Deep Space Climate Observatory. My goal is to determine reflectance of the Earth's surface by making atmospheric correction of satellite data. The atmosphere absorbs and scatters the sunlight. I need to remove these effects, as if we were observing Earth from space without any atmosphere.

Where were you born and raised?

I was born on the eastern slopes of the Ural Mountains in Russia, which was then the Soviet Union. I grew up in Oktyabrskii, a city of about 100,000 people, also near the Urals. Oktyabrskii is named after the October 1917 Red Revolution.

What attracted you to science?

As a child, I used to go to the local public library. They had a handful of highly technical scientific books which I tried to read without much success. They also had a more popular book on cosmology by Viktor Shklovsky, which made a great impression on me and nurtured my desire to become a scientist.

What was your life like in the Soviet Union during perestroika?

I received my Ph.D. [from the Space Research Institute in Moscow] during the time of perestroika in Russia. The Soviet system was falling apart. Funding for science was at an extremely low level. I had a couple of very difficult years. Also, my wife left in 1993 to attend graduate school at Johns Hopkins University on a student visa and brought our three kids with her.

How did you come to the United States and Goddard?

Around 1988, while I was doing my Ph.D., I met Bob Murphy, who worked at NASA Headquarters at the time. We talked extensively about science. In late 1996, he con-

tacted me again and offered me a job supporting MODIS. I accepted immediately and came to Goddard in 1997, finally rejoining my family.

How did Bob Murphy influence you?

I think that our assessment of scientific research was somewhat similar. Bob liked my earnest and nonpolitical assessments, attitude, and drive. Bob is a wonderful person who greatly helped me and my family. We remain good friends.

What was your biggest cultural challenge?

For years, I could not admit that I didn't know something. I was stunned at how the top-level scientists here could admit that they didn't know something. It took me years to overcome this. In the old Soviet system, if you admitted that you didn't know something, it would make you look weak in front of other scientists.

Are you close to other scientists from the former Soviet Union at Goddard?

There are quite a few of us here. We often get together and discuss just about everything. It is always relaxing to speak in your mother tongue. This group was very important to me when I first came here so I didn't get nostalgic or homesick.

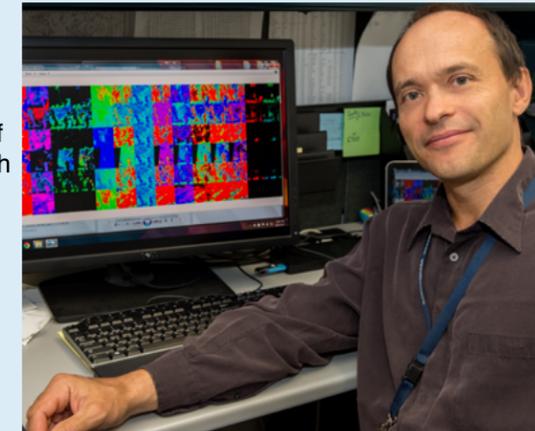
Tell us about your current work group.

I currently have two scientists in my group and am hiring one more. I have very high standards and requirements. Both of my scientists are truly outstanding specialists in their area. I just tell them the problem and they bring me the solution.

What advice would you give to young scientists?

Don't be afraid. Take on the most challenging problems. If you cannot solve them, it only means that you are missing something. Be persistent. In the end, you will find a solution. When you get to solve some of the most challenging problems, you get an unbelievable feeling. ■

Photo credit: NASA/Goddard/Alexei Lyapustin





ANNUAL MUSEUM LECTURE ENCOURAGES EXPLORATION OF 'OUR VIOLENT UNIVERSE'

By **Jenny Hottle**

When Ed Weiler first started working at NASA's Goddard Space Flight Center in the late 1970s, scientists knew a lot about the universe, but some lingering questions about space remained unanswered.

Do black holes really exist, or are they just science fiction? Where did the universe come from? How did the elements that comprise life originate? Are humans alone in the universe?

Nearly four decades later, Weiler — a former associate administrator for the NASA Science Mission Directorate and a former Goddard center director — and several NASA scientists shared the progress made in understanding the universe during an evening lecture and reception on Sept. 30 at the Smithsonian National Air and Space Museum in Washington, D.C.

"We mere humans just in the past 30 years have built space observatories which have enabled our minds and our spirits to travel any place in this vast universe," Weiler said.

Sponsored by the Maryland Space Business Roundtable and organized by the Goddard Office of Communications, the annual event has taken place for the past 16 years, allowing the agency's scientists to highlight recent research achievements in a variety of fields. Approximately 1,000 guests — including NASA personnel, congressmen, academic leaders and industry representatives — attended this year's event. Students, parents and teachers from the Oxon Hill High School robotics team in Maryland and military veterans from the Wounded Warrior Project were also present.

"We received more RSVPs this year than all the previous years and were very excited about the enthusiasm and interest," said Jingli Yang, president of the Maryland Space Business Roundtable. "Besides the cutting-edge astrophysical science lecture and great food, our members and guests had a chance to network with government and industry partners."

Delivering talks around the theme "Our Violent Universe," presenters discussed their findings for some of the biggest high-energy astrophysics mysteries.

"These missions and these discoveries don't just happen with one person," said Goddard Center Director Chris Scolese. "It

takes a team of people from around the world — from government, industry and academia — to make it happen."

In addition to Weiler, presenters included John Grunsfeld, associate administrator for the NASA Science Mission Directorate; Jeremy Schnittman, Goddard research astrophysicist; Fiona Harrison, principal investigator for the Nuclear Spectroscopic Telescope Array; Neil Gehrels, chief of the Goddard Astroparticle Physics Laboratory; and Joan Centrella, deputy director of the Goddard Astrophysics Science Division.

"These presentations really give people in industry and academia a chance to see how Goddard is contributing to astrophysics," said Trusilla Steele, who co-organized the event with fellow Goddard Public Affairs Specialist Leslee Scott.



Claire Saravia, who produced the lecture, enjoyed bringing greater attention to the evening's subject matter. "High-energy astrophysics is so rich in interesting material, but it's very difficult to grasp," she said. "I'm proud to have helped play a role in spreading the word about some of the universe's most fascinating phenomena."

Standing under an enlarged image of the Milky Way, Centrella closed the event by telling the audience that ground-based observations are just the beginning of space exploration, and she encouraged attendees to ponder deeper questions about the universe.

"Much of the story can only be learned using instruments that are not subject to limitations posed by our atmosphere," Centrella said. "These high-energy missions uncover a dynamic universe — one dramatically different from the tranquil tapestry we see above on a night sky from Earth." ■

Center: Event attendees gather during the reception at the Smithsonian National Air and Space Museum in Washington, D.C. Photo credit: NASA/Goddard/Bill Hrybyk

Opposite, top: Goddard Center Director Chris Scolese delivers an introduction for the evening's lecture. Photo credit: NASA/Goddard/Bill Hrybyk

Opposite, bottom: NASA Deputy Administrator Dava Newman (right) speaks with veterans Jose Perez (left) and Jonathon Rodriguez from the Wounded Warrior Project during the reception. Photo credit: NASA/Goddard/Bill Hrybyk



RECORD CROWD COMES OUT TO

By Ashley Morrow

For the first time in four years, NASA's Goddard Space Flight Center opened its gates to the public on Sept. 26. Under the theme "Celebrating Hubble and the Spirit of Exploration," the Explore@NASAGoddard open house welcomed more than 20,000 guests on center, up from 15,000 during the last such event in 2011.

More than 150 exhibits, presentations and tours provided an exclusive look at the center's work across numerous missions and projects.

Guests could catch a glimpse of some of the inner workings of Hubble, which celebrated its 25th launch anniversary in April. Since 1990, the observatory has made countless observations that have led to groundbreaking discoveries about our universe. The open house is part of a yearlong celebration for what has been widely regarded as the "people's telescope."

The center hosted tours inside the Hubble control room and inside an exact duplicate of Hubble's Vehicle Electrical System Test Facility. Several Hubble experts also spoke about the observatory's achievements.

"It is important for us to interact with the public and share the incredible discoveries and technological advancements that Goddard has done on its behalf. The Hubble mission is a great example of a NASA success story, and the Explore@NASAGoddard event gave us a forum to talk directly with the public and answer questions," said Hubble Deputy Project Manager Jim Jeletic, who organized many of the telescope's exhibits. "I was happily surprised by the enormous turnout we had. All of our Hubble activities and tours were beyond capacity, even though we had over 50 Hubble staff volunteers that day."

More than 10 buildings on center were open to visitors. On one of the most popular self-guided tours, guests walked through the Goddard Integration and Testing Facility, where spacecraft are put together and tested to withstand the rigors of space.

Right next door, attendees got a first-hand look at Goddard's high bay clean room. In this facility, the largest of its kind in the world, engineers are currently constructing the James Webb Space Telescope, successor to Hubble and set to become the most powerful space telescope ever built upon its completion in 2018.

"You could see the amazement in everyone's eyes when they saw the size of our test facilities and found out what they could do," said Ed Packard, associate head of the Goddard Environmental Test Engineering and Integration Branch. "Anybody that wasn't a space enthusiast before they got here is certainly more likely to be one now!"

And with so much to do, the public found many ways to feed that enthusiasm.

"I loved getting to see the NASCOM operations center," said Aresa Harewood of Lanham, Maryland. Short for "NASA Communications," NASCOM monitors communications with orbiting missions. "We got to see all the numbers going across the screen and the data coming in."

Since 2011, Goddard has seen rapid growth in its four science disciplines: astrophysics, Earth science, planetary studies and heliophysics. In the past four years, the center has launched more than 10 missions, which serve both as a magnifying glass on our own planet and as a telescope to the rest of the universe. Much of Goddard's efforts bal-



EXPLORE GODDARD

ance the two, focusing on finding and exploring worlds like our own as well as studying the world we live on to improve our lives on Earth.

In addition to using exhibits to demonstrate how Goddard accomplishes these objectives, the center scheduled some worthy speakers — including Nobel physics laureate John Mather, renowned climate scientist Claire Parkinson, and NASA Science Mission Directorate Associate Administrator John Grunsfeld — to explain it further. Jim Green, director of the NASA Planetary Science Division, also delivered a presentation on how the Mars expedition in the film "The Martian" compares with work being done at Goddard and throughout NASA.

And the day's attractions were not just technical. They also included a chance to get autographs from astronauts, interact with Goddard's social media team, view a live production by Goddard thespians, listen to a science comedy show and much more.

Visitors primarily came from Maryland, Virginia and Washington, D.C., but others came from hundreds of miles away, such as Nancy Curran from Indianapolis.

"It's totally amazing. It's wonderful to see so many families here," she said. "The social media tent was cool because kids could wear astronaut helmets and take pictures with inflatable planets."

Other highlights included a close-up look at robots used to develop new satellite servicing technology, visualizations of same-day Earth science data, interactions with Star Wars characters, exhibits from Tesla Motors and LEGO, and more than 20 food trucks with diverse offerings. ■

Above, left: Explore@NASAGoddard attendees wait to enter the control room for the Hubble Space Telescope. Photo credit: NASA/Goddard/Melissa Meyers

Above, right: Star Wars characters interact with guests during Explore@NASAGoddard. Photo credit: NASA/Goddard/Debra McCallum

Below: Exhibitors launch model rockets at the Goddard visitor center as part of the open house event. Photo credit: NASA/Goddard/Tabatha Luskey



EXPLORE@NASAGODDARD:



MORE THAN 20,000 STRONG



Photo credits: NASA/Goddard/Jay Friedlander, Bill Hrybyk, Karen Johnson, Tabatha Luskey, Debora McCallum, Melissa Meyers and Kevin Reed

'Urinetown' Brings Scientific Satire to Bathroom Breaks

By Clare Skelly

If you go to the bathroom while at NASA's Goddard Space Flight Center, you might see a flier for a musical about, well, going to the bathroom. Such a production may seem peculiar, yet it warrants intrigue. You can learn how it all comes together as the Goddard Music and Drama Club performs the Tony Award-winning "Urinetown."

"Despite the funny – maybe even off-putting – name, 'Urinetown' is very much a Broadway musical," said Elliot Malumuth, the show's producer. A Goddard astronomer, Malumuth is a MAD veteran, having been involved with its productions since 1994.

The satirical comedy musical from 2001 features traditional Broadway-style music and a familiar boy-meets-girl storyline. In contrast to previous MAD productions, the fall show makes connections to Goddard Earth science research and missions.

In "Urinetown," a severe drought plagues a municipality for several decades. Due to the mismanagement of resources, politicians ban the use of private toilets and mandate payment to use public restrooms. "As the divide between the rich and the poor widens, the poor cannot 'hold it any longer' and the time is right for a revolution," explained Katrina Jackson, the musical's director and a science video producer at Goddard.

A recent NASA study predicts that by the end of the 21st century, the American Southwest and Central Plains will experience longer and more severe droughts than at any other time in the last 1,000 years. The current situation on the West Coast generates concern among policymakers.

NASA missions, such as the Global Precipitation Measurement and Soil Moisture Active Passive, help scientists understand precipitation patterns and better predict rainfall and droughts.

"I hope this musical brings together aspects of Goddard and uses theatre as a medium to encourage some of these discussions about how to balance the

needs of the environment, businesses and individuals," Jackson added.

She submitted the proposal for "Urinetown" last May. She performed in the musical during graduate school, starring as a tap-dancing secretary and singing in the chorus.

The current cast consists of about 30 people, including Goddard employees, retirees, family members and people from the local community. Virginia Zanner, who helped found MAD as a Goddard special interest group in the 1970s, is one of the performers. The group, new members and old, began rehearsing in August.

As opening night approached, MAD started promoting the musical. Publicity was a no-brainer, according to Jackson. In addition to posting fliers in Goddard's bathroom stalls, the group also uses social media to target external audiences, writing clever posts such as, "Urinetown' tickets are now on sale! Do your happy dance! Which might look suspiciously like a need-to-go-potty dance..."

Malumuth's pitch for why people should see "Urinetown" is simple: It's entertaining. "The show knows the premise is absurd and makes fun of itself as well as traditional Broadway shows," he said.

While the musical is humorous, Jackson and Malumuth hope the audience leaves with more than just a laugh. "As in any art, making people think is part of what you do," Malumuth added. ■

"Urinetown" runs from Oct. 23 through Nov. 14. For more information and to purchase tickets, visit www.madtheater.org.

Center: Cast members rehearse for the Goddard Music and Drama Club's fall production of "Urinetown."

Photo credit: NASA/Goddard Photo Club/Nancy Rosenbaum

