National Aeronautics and Space Administration

GoddardView

Volume 15 Issue 4
September - December 2019

www.nasa.gov

GoddardView

TRENDING

IceBridge Completes Eleven Years of Polar Surveys
Eleven years after beginning operations in 2009, Operation IceBridge completed its last polar flight on Nov. 20, one year following the successful launch of ICESat-2. The IceBridge team will complete one more set of Alaska flights in 2020.

Miss Universe Ireland 2019 Pays a Visit to Goddard
Fig O'Reilly, a member of NASA's Datanaut program, was crowned Miss Universe Ireland 2019. She recently stopped by Goddard to learn more about the center's work in science, engineering and STEM engagement.

ICON Launches Into Orbit
The Ionospheric Connection Explorer (ICON) launched into orbit on Oct. 10 from Cape Canaveral Air Force Station in Florida. ICON will study the dynamic zone high in our atmosphere where terrestrial weather from below meets space weather above.

Sustaining Women in STEM Takes Place at Bowie State University
In partnership with SAIC and Bowie State University in Maryland, Goddard hosted the third Sustaining Women in STEM roundtable – a gathering of leaders focused on better engaging women in STEM fields.

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On the cover: Mercury is seen in silhouette (low center) as it transits across the face of the Sun on Nov. 11 from Washington, D.C.

Photo credit: NASA/Bill Ingalls

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.

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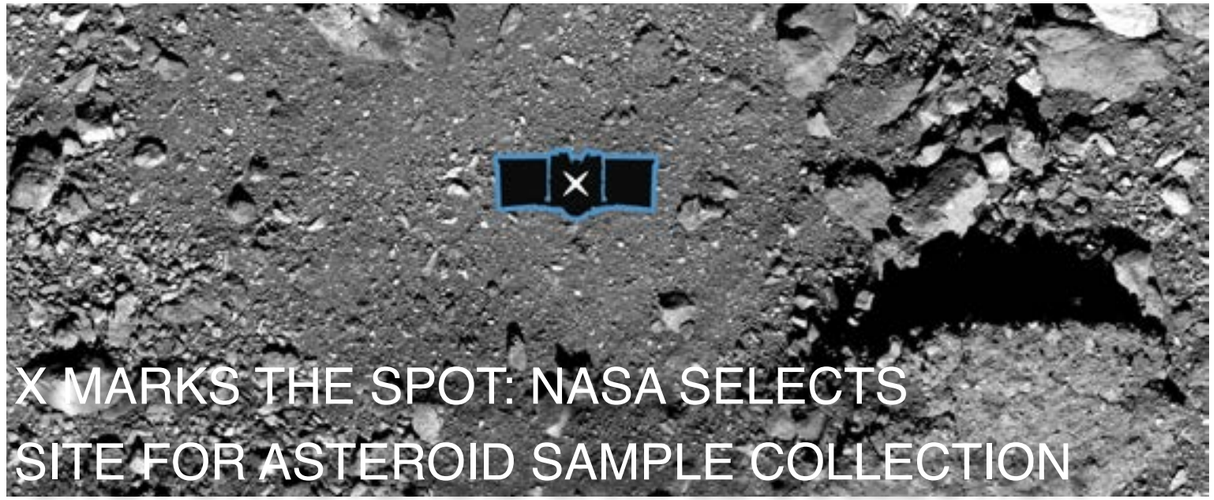


X MARKS THE SPOT: NASA SELECTS SITE FOR ASTEROID SAMPLE COLLECTION

After a year scoping out asteroid Bennu's boulder-scattered surface, the team leading NASA's first asteroid sample return mission has officially selected a sample collection site. The Origins, Spectral Interpretation, Resource Identification, Security, Regolith Explorer (OSIRIS-REx) mission team concluded a site designated "Nightingale" – located in a crater high in Bennu's northern hemisphere – is the best spot for the OSIRIS-REx spacecraft to snag its sample.

The OSIRIS-REx team spent the past several months evaluating close-range data from four candidate sites in order to identify the best option for the sample collection. The candidate sites – dubbed Sandpiper, Osprey, Kingfisher and Nightingale – were chosen for investigation because, of all the potential sampling regions on Bennu, these areas pose the fewest hazards to the spacecraft's safety while still providing the opportunity for great samples to be gathered.

"After thoroughly evaluating all four candidate sites, we made our final decision based on which site has the greatest amount of fine-grained material and how easily the spacecraft can access that material while keeping the spacecraft safe," said Dante Lauretta, OSIRIS-REx principal investigator at the University of Arizona in Tucson. "Of the four candidates, site Nightingale best meets these criteria and, ultimately, best ensures mission success."

Site Nightingale is located in a northern crater 460 feet (140 meters) wide. Nightingale's regolith – or rocky surface material – is dark, and images show that the crater is relatively smooth. Because it is located so far north, temperatures in the region are lower than elsewhere on the asteroid and the surface material is well-preserved. The crater also is thought to be relatively young, and the regolith is freshly exposed. This means the site would likely allow for a pristine sample of the asteroid, giving the team insight into Bennu's history. Although Nightingale ranks the highest of any location on Bennu, the site still poses challenges for sample collection. The original mission plan envisioned a sample site with a diameter of 164 feet (50 meters). While the crater that hosts Nightingale is larger than that, the area safe enough for the spacecraft to touch is much smaller – approximately 52 feet (16 meters) in diameter, resulting in a site that is only about one-tenth the size of what was originally envisioned. This means the spacecraft has to very accurately target Bennu's surface. Nightingale also has a building-size boulder situated on the crater's eastern rim, which could pose a hazard to the spacecraft while backing away after contacting the site.

The mission also selected site Osprey as a backup sample collection site. The spacecraft has the capability to perform multiple sampling attempts, but any significant disturbance to Nightingale's surface would make it difficult to collect a sample from that area on a later attempt, making a backup site necessary. The spacecraft is designed to autonomously "wave-off" from the site if its predicted position is too close to a hazardous area. During this maneuver, the exhaust plumes from the spacecraft's thrusters could potentially disturb the surface of the site, due to the asteroid's microgravity environment. In any situation where a follow-on attempt at Nightingale is not possible, the team will try to collect a sample from site Osprey.

"Bennu has challenged OSIRIS-REx with extraordinarily rugged terrain," said Rich Burns, OSIRIS-REx project manager at NASA's Goddard Space Flight Center. "The team has adapted by employing a more accurate, though more complex, optical navigation technique to be able to get into these small areas."

With the selection of final primary and backup sites, the mission team will undertake further reconnaissance flights over Nightingale and Osprey, beginning in January and continuing through the spring. Once these flyovers are complete, the spacecraft will begin rehearsals for its first "touch-and-go" sample collection attempt, which is scheduled for August. The spacecraft will depart Bennu in 2021 and is scheduled to return to Earth in September 2023. ■

Above: Sample site Nightingale, OSIRIS-REx's primary sample collection site on asteroid Bennu. Photo credit: NASA/Goddard/University of Arizona

GODDARD HONORS AN APOLLO-ERA PIONEER, HIS LEGACY

By Christina Mitchell

Hailing from humble beginnings in rural Wales, Tecwyn Roberts came to be one of the key players in the space race that left us with the legacy of Apollo. Roberts, who also helped establish the Satellite Servicing Control Center at NASA's Goddard Space Flight Center in Greenbelt, Maryland, was known for his competence, work ethic and calm nature.

"Tecwyn Roberts could rightly be labeled as one of the great unsung heroes of the space age," said Nick Howes, a test analyst and space R&D team member at BMT, a multinational engineering and research and development company. "Without Tec, NASA and mission control as it exists today would probably not have happened."

Howes, a fellow of the Royal Astronomical Society and fellow Welshman, is coordinating to send a Welsh flag over to be placed on Roberts' grave. "It seemed very fitting the flag is being sent now, as this year is the 50th anniversary of the historic Apollo missions 10, 11 and 12," Howes said.

Roberts helped set up the mission control room in the Apollo era, according to NASA archives. The design of mission control took significant planning and coordination to give the Apollo missions the best chance of success. Later in his career, Roberts came to Goddard.

"I've supported NASA manned spaceflights from mission control at Johnson Space Center, robotic operations aboard the International Space Station from the Goddard Satellite Servicing Control Center here at Goddard, I've received phone calls and emails from spacecraft orbiting the Earth … all because Tecwyn Roberts said, 'It CAN be done,'" said Ed Rezac, the former Sierra Lobo project lead at Goddard.

"Some have suggested that it is his very background of modest means, of problem solving out of necessity with only what you have available, that enabled him to see problems and solutions clearly," Rezac said. "And I suspect, based on the recollections of other major players of the time, that his humble and approachable demeanor not only made him easy to work with, but also attracted the best to want to work with him."

Tecwyn Roberts was NASA's first FIDO, or flight dynamics officer. It was his responsibility to figure out how to communicate with astronauts in space, and he served in that role starting with Mercury and the historic flights of Alan Shepard and John Glenn.

Gary Morse, former NASA space shuttle network director who worked with Roberts when the latter took a contractor position following retirement, said that Roberts "essentially invented" the FIDO position. "Nobody knew how to do that job."

Roberts was always excited to be working on the space program, and that showed in his work, Morse said.

"He taught others how to lead and focus on the real issues," he said. "He didn't say much, but when he did, it was very important. When to delegate and when not to delegate."

During his agency career, Roberts received the NASA Exceptional Service Medal, NASA Distinguished Service Award and the Robert H. Goddard Award of Merit, among other high honors.

The flag memorial being organized by Howes includes signatures from Welsh scientists Martin Griffiths, a space science lecturer at the University of South Wales; Allan Trow, the director of Dark Sky Wales; Katrin Raynor-Evans, writer for the BBC's "Sky at Night;" and Gavin Price, a spaceflight speaker on Apollo.

The flag will be placed at Roberts' grave during the anniversary of Apollo 12, which flew from Nov. 14 to 24, 1969.

"His rise from humble beginnings in such a small town so very far away, I hope will continue to inspire the next generation of engineers," Howes said. "And the many STEM groups who visit Goddard, I hope will see any tribute to him and realize that whilst Apollo was a great American achievement, the United States' closest allies played a part and proudly in helping NASA achieve something, which, 50 years on, has still to be matched." ■

Center: Goddard's Ed Rezac received a Welsh flag signed by colleagues, countrymen and admirers of former NASA mission operations and communications pioneer Tecwyn Roberts.

Photo credit: NASA/Goddard/Christina Mitchell

NASA INVITED TO U.S. PATENT AND TRADEMARK OFFICE TO CELEBRATE APOLLO 50TH ANNIVERSARY

By Kathryn Cawdrey

In 1969, NASA engineers, scientists, astronauts and innovators banded together to send humans to the Moon for the very first time, but they required outside assistance to make it happen. With the help of small tech companies across the globe, John F. Kennedy's vision became reality. On July 20, 1969, Neil Armstrong and Buzz Aldrin set foot on the surface of the Moon—a moment made possible through collaboration between tech pioneers worldwide.

The U.S. Patent and Trademark Office (USPTO) celebrated these partnerships during an Apollo 50th anniversary celebration on July 23. The sold-out event filled 500 seats and offered standing room only in the Clara Barton Auditorium of the USPTO in Alexandria, Virginia. NASA Administrator Jim Bridenstine gave the keynote speech, followed by a panel of federal government executives, astronauts, inventors and commercial industry executives.

The discussion centered around the technology that sent Apollo astronauts to the Moon, where it came from and how it has developed over time.

"This tech has improved the human condition in a way that was never expected when Eisenhower created NASA," Bridenstine said. "The way we communicate, navigate, produce food and produce energy is changing."

In the '60s NASA recruited tech companies to send people to the Moon, and has plans to do so again. In the coming years through the Artemis program, NASA will send the first woman and the next man to the Moon to stay. Following extensive research and experimentation, NASA astronauts will take what they've learned and journey to Mars.

"Things you thought were impossible could happen," astronaut Kathryn Sullivan said on a panel. "We need to set bold goals, and the challenge of this country is not to blink."

While NASA works with tech companies to make Artemis a reality, the agency's past achievements are reflected in everyday technology. The Apollo missions benefitted humanity by laying the groundwork for quake-proofing, rechargeable hearing aids, food safety and digital flight control.

"We at NASA like dreaming of the future," said Frank Cepollina, former associate director of NASA's Satellite Servicing Capabilities Office and USPTO Inventors Hall of Fame inductee. "But what's happening today, tomorrow and the next day?" ■

Above: NASA Administrator Jim Bridenstine gives the keynote speech during a 50th anniversary celebration of the Apollo 11 Moon landing at the U.S. Patent and Trademark Office in Alexandria, Va.

Photo credit: U.S. Patent and Trademark Office

ACROSS THE MILES: GODDARD AMATEUR RADIO CLUB CELEBRATES MILESTONES

By Mary C. Collins

This year, the Goddard Amateur Radio Club (GARC) celebrated its 50th anniversary with a variety of open house events and activities. Longtime members and their families welcomed potential new members, which included new employees and interns eager to learn about the extracurricular activities offered through the Goddard Employees Welfare Association. Attendees toured the radio shacks, saw equipment demos, and socialized over burgers and hot dogs.

This summer, GARC celebrated the Apollo 11 Moon landing by joining clubs from five other NASA centers in a NASA on the Air special event. Amateur radio operators worldwide were invited to make contact with as many NASA radio clubs as they could, attracting nearly 5,700 participants who made more than 8,600 contacts. GARC made 2,020 contacts with other stations during the anniversary celebration and mailed several hundred commemorative postcards to operators who requested them.

In 1969, the Goddard Amateur Radio Club was founded for amateur radio operators who love to pursue their passion for learning about wireless communications. This includes high frequency (HF) long-distance communications, analog and digital encoding, and amateur satellite and CubeSat operation.

Over the last half-century, the club has connected the International Space Station with local schools, broadcast HF retransmissions of the voices of space shuttle astronauts and held licensing classes for new operators.

Another exciting milestone occurred in 2019 – the 100th anniversary of the Federal Communications Commission call sign WWV. In its early years, WWV resided where the Goddard Visitor Center stands. To save on construction funds, NASA included one of the brick walls from the earlier building inside the walls of the new visitor center. GARC also inherited and reused some of 100-foot-tall wooden poles from which WWV strung antennas to transmit its own HF radio signals.

GARC, with the assistance of counterparts in Colorado, set up a link via smart phones and the Internet from the visitor center to Ft. Collins, Colorado, to allow participation in the National Institute of Standards and Technology's 100-year anniversary celebration. Club members were seated exactly at the WWV historic location in the visitor center.

To learn more about GARC, visit https://garc.gsfc.nasa.gov. ■

Above: The Goddard Amateur Radio Club hosts an open house event to celebrate its 50th anniversary. Photo credit: NASA/Goddard/Mary C. Collins

Below: The site of the original WWV call sign, where the current Goddard Visitor Center stands. Photo courtesy: NASA/Goddard Amateur Radio Club

By Karl B. Hille

Visitors to Goddard's Building 1 and Building 21 cafeterias encountered two sculptures by local artist George Sabra. Inspired by global efforts at addressing climate issues, Plastic Storm spirals overhead as a tornado of plastic bottles and bottle caps, while Knot is a 10-foot-plus sculpture of an overhand knot made by crushed oil drums welded from end to end.

As part of its observance of National Energy Awareness Month in October, Goddard held its annual Energy Awareness Event on Oct. 9 at the cafeterias. Vendors exhibited various energy-saving technologies and discussed energy conservation and rebates, and there were door prizes and giveaways.

"We selected this artist because his work is about sustainability, as well as reducing greenhouse gasses and carbon footprints," said Evelyn Baskin, Goddard energy manager. "We're trying to promote energy reduction any way we can."

Sabra said he used only reclaimed materials, soliciting donated bottles and bottle caps, for instance, and sourcing discarded oil barrels.

"It's a way to engage the public," Sabra said. "The object is familiar to people in a way. We're all using those objects on a daily basis."

Originally commissioned by the city of Austin, Texas, Sabra said he was inspired by the COP21 climate summit in Paris in 2016 and wanted to "tie the knot on burning the fossil fuels."

For the next climate summit, Sabra plans to exhibit new work in Glasgow, Scotland. ■

Above: Artist George Sabra poses next to his environmental sculpture Knot. Photo credit: NASA/Goddard/Taylor Mickal

VISIT FROM A PLASTIC STORM

Stefan Flessa

Code 210, Contract Specialist

Why Goddard?: NASA's reputation as a great place to work.

Hobbies/interests: cooking, baking bread, board games, table tennis

Shani Smith

Code 210, Contract Specialist

Why Goddard?: It's the best large agency to work for, and I basically grew up here.

Hobbies/interests: watching children participate in sports

Alexa Halford

Code 675, Research Scientist

Why Goddard?: The work is interesting, but so are the people.

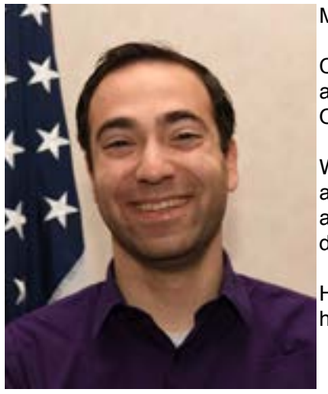
Hobbies/interests: photography, figure skating

Jade Skaf

Code 501, Resource Analyst

Why Goddard?: Growing up in Syria, I was amazed how NASA made it possible for humans to get to the Moon, Mars and beyond!

Hobbies/interests: tennis, running, swimming



Michael Silber

Code 383, Chief Safety and Mission Assurance Officer for AWE/GUSTO

Why Goddard?: The ability to solve different and unique problems on a daily basis.

Hobbies/interests: theater, hockey, choir

Brooke Greybeck

Code 373, Quality Engineer

Why Goddard?: To be a part of space science research and instrument development.

Hobbies/interests: learning new things, soccer, dogs

EMPLOYEE SPOTLIGHT

Goddard is pleased to welcome these new employees to the NASA community.

MUSIC AND DRAMA CLUB STAGES PRODUCTION OF 'THE DROWSY CHAPERONE'

The Goddard Music and Drama Club (MAD) put together a production of "The Drowsy Chaperone," based on the book by Bob Martin and Don McKellar.

The story of "The Drowsy Chaperone" is set in the 1920s with the decadence of the age (and humor) abounding. Narrated by the Person in the Chair, who is both a Broadway fanatic and someone looking to cure their sadness, the story allows the exploration of a parody of 1920s musical comedy. This parody includes a wealthy widow, a young starlet, a Latin lover and a groom ending up on roller skates blindfolded.

"I wanted to stage a show that is intended, at its heart, for the pure enjoyment of the audience. You will meet new and crazy characters, laugh at their over-the-top humor, feel the Art Deco ambiance of the 20s, and maybe even recount a beloved musical of your own," wrote the play's director, Ben Rollins.

"The Drowsy Chaperone" opened on Broadway in 2006 and was nominated for 13 Tony awards, winning five, including best book and best original score.

The play ran from Oct. 25 to Nov. 10 at the Barney & Bea Rec Center. For more information on MAD, visit www.madtheater.org. ■

Photo credit: Terry Nguyen

‘WINTER ARRIVES’ AT EIGHTH

ANNUAL HOLIDAY OPEN HOUSE

Under the theme “Winter Is Coming,” the Goddard Office of the Center Director hosted its eighth annual Holiday Open House on Dec. 4. Employees from across the center gathered for food, fun and festivities to celebrate the center’s accomplishments over the past year. ■

Photo credits: NASA/Goddard/Taylor Mickal

SERGEY KORKIN WRITES ALGORITHMS TO SIMULATE INSTRUMENT FINDINGS

By Elizabeth M. Jarrell

What do you do and what is most interesting about your role here at Goddard? How do you help support Goddard's mission?

Although I am trained as an electro optical systems engineer, I am currently working as an atmospheric scientist in the Climate and Radiation Laboratory. I write algorithms to simulate solar light scattering in the lower Earth atmosphere. My ultimate goal is to simulate what instruments on our satellites and on ground-based devices will see when operational.

Were you educated in Moscow?

I was born outside of Moscow. I earned all of my degrees, including a Ph.D. in electro optical systems, from Moscow Power Engineering Institute.

How do you write algorithms to simulate solar light scattering in the lower Earth atmosphere, and how do you apply them?

Broadly speaking, the three main parts to atmospheric science are measurement, modeling or simulation, and comparison of the two. I focus on the modeling or simulation part. Basically, modeling translates from what the instrument sees to what is actually happening in the atmosphere. The people who build the instruments ensure that the instruments work correctly. That is not my headache. My headache is building the model that includes all important factors and atmospheric parameters, such as multiple light scattering as light bounces through the atmosphere, surface reflection, ocean waves, vertical air density, aerosols, clouds and gas absorption of light. There are others, but I think these are enough for now.

At this point, other scientists use my model to perform the retrieval of what the instrument has measured using additional algorithms they have derived.

Let's assume a group of atmospheric scientists has a working instrument and a working computer program for the retrieval. The output of the computer program depends on certain atmospheric parameters, which I just listed above. If, for example, we are looking at air pollution, then we first take an educated guess about the concentration of the particles. Then we run our program. We compare the output of the program to what the instrument has measured. We then adjust the program to match the instrument's measurement.

What is the biggest difference between Moscow and the Washington, D.C., area?

I enjoy the Washington, D.C., area's diversity. At Goddard, I work with people from around the world. Just within our laboratory, I can visit with people from everywhere. I can learn about education, medical systems, science and the arts in their countries.

What do you enjoy most about working at Goddard?

Goddard is a melting pot, just like the surrounding area. I work with top tier scientists and engineers from around the world. I am constantly learning from them, which is easier than only reading books on a subject because I can ask these experts questions.

Who are your mentors?

I am forever grateful to several people who helped make my new life here comfortable. There are too many to individually thank. However, I would like to especially thank my Goddard supervisor, Dr. Alexei Lyapustin, whom I have had the good fortune of knowing for a decade, and my doctoral adviser in Moscow, professor Vladimir Budak, both of whom are responsible for my being here at Goddard.

What lessons or words of wisdom would you pass along to somebody just arriving from a foreign country and starting their career at Goddard?

Never refuse to listen to advice. It is free, after all. But you don't have to apply the advice you receive all at once. Some advice will never be applicable to you, while the value of other advice will become obvious over time. Trust yourself and take advantage of every opportunity. ■

Center: Sergey Korkin

Photo courtesy: Sergey Korkin