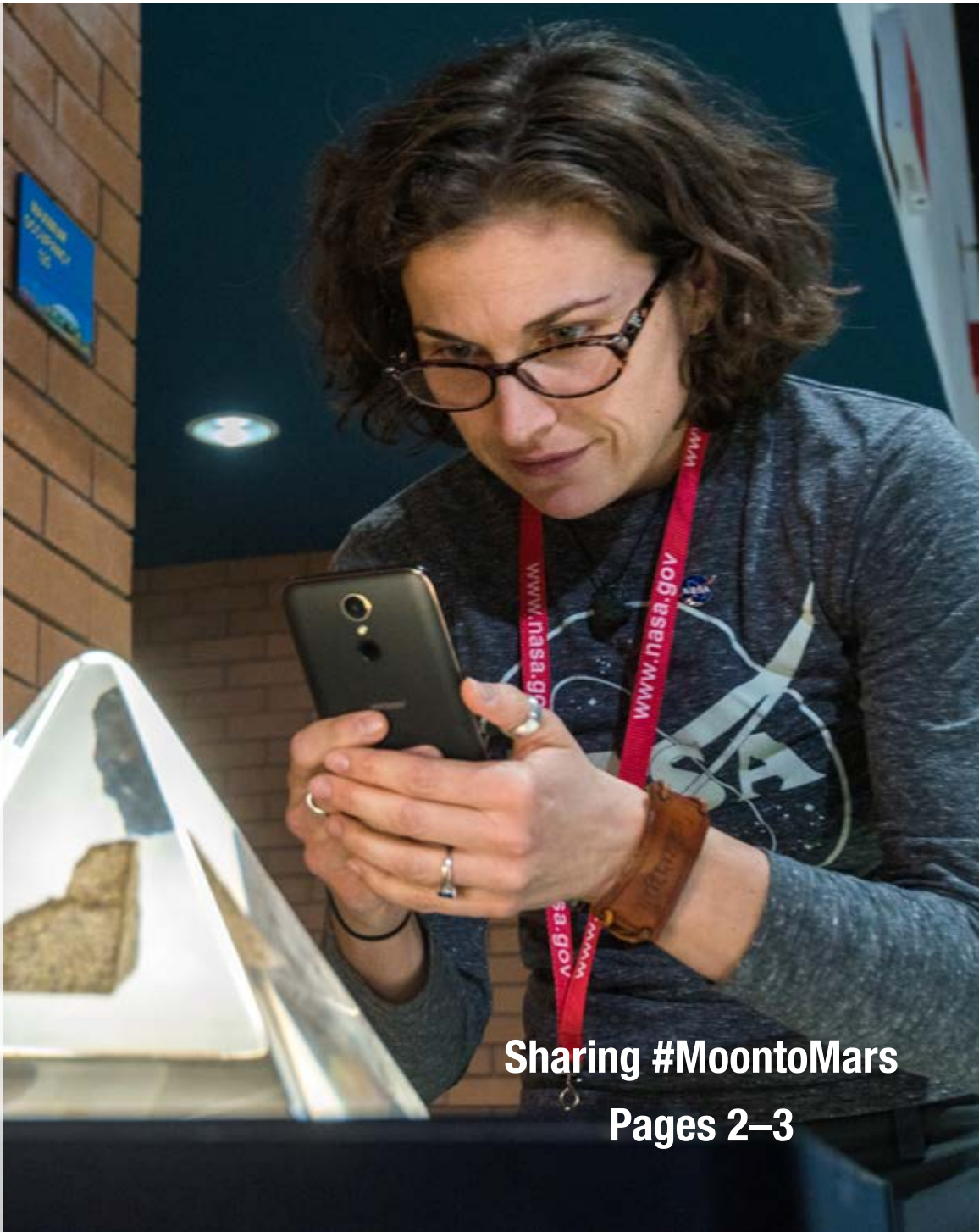
National Aeronautics and Space Administration

AeroSpace FRONTIERS

VOLUME 21 • ISSUE 3 • APRIL 2019



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Valuable Contributions to Crew Dragon Demo-1 Mission Success

On March 8, the SpaceX Crew Dragon Demo-1 completed its 5-day mission to the International Space Station (ISS), the first orbital test of this spacecraft. This spacecraft has been years in the making and Glenn touched on many aspects of its success. The docking to the ISS was safely accomplished in part by the Glenn Seals team who developed the unique seals for the main interface to prevent cabin air leakage. The Plum Brook Station team provided test verification in complex space environments. I appreciate all our contributions to this mission, a mission that will lead to the United States' first crew transport to the ISS since the space shuttle.

Thank you for working with our commercial partners to assure safety and mission success!

AeroSpace Frontiers
is an official publication of Glenn Research Center, National Aeronautics and Space Administration. It is published the second Friday of each month by the Office of Communications & External Relations in the interest of the Glenn workforce, retirees, government officials, business leaders and the general public.

Submit short articles and calendar items to the editor at doreen.b.zudell@nasa.gov.

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Moon to Mars Event Draws Media, Social Influencers

NASA Glenn joined centers throughout the agency in welcoming members of the media and social media for a Moon to Mars event on March 11.

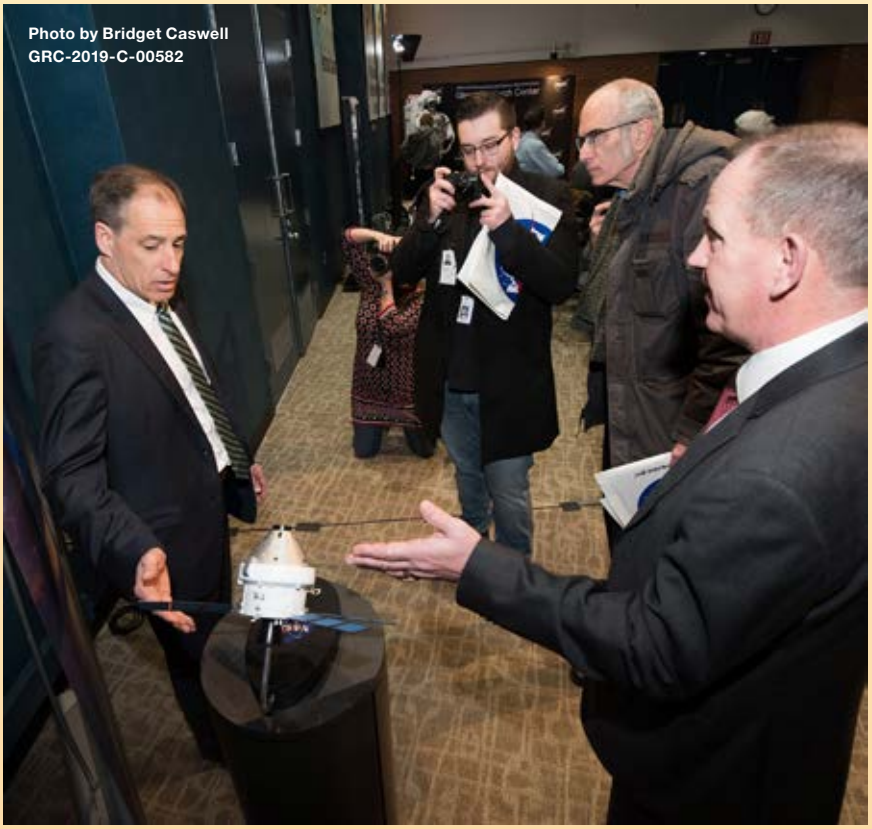
Photo by Bridget Caswell
GRC-2019-C-00582

Space Flight Systems Director Bryan Smith, left, and Chief Financial Officer Larry Sivic, right, answer questions about the Orion spacecraft from local media.

On the Cover:
Burgundie Miceli, a guest at the Moon to Mars event, snaps a photo of an authentic moon rock at Glenn to share through social media.

Photo by Bridget Caswell
GRC-2019-C-00560

At right: Media and social media guests view Bridenstine's live address.

To view more photos, visit **https://www.flickr.com/photos/nasaglenn/albums**.

The day featured a behind-the-scenes look at each center's work to return astronauts to the moon for long-term exploration. It also included the viewing of Administrator Jim Bridenstine's live address on the President's fiscal year 2020 (FY 2020) proposed budget and how it supports NASA's mission.

Glenn's Digital Communications team, Office of Communications and External Relations, hosted the NASA Social at Lewis Field, which welcomed 13 social media influencers. A space technology showcase in the Briefing Center, staffed by Glenn subject matter experts, offered attendees a variety of exhibits, demonstrations and virtual reality technologies centering on moon exploration.

Representatives from six media outlets then joined social media influencers in the Briefing Center for a welcome and center overview from Center Director Dr. Janet Kavandi.

"NASA Glenn is honored to be providing the very first component of a platform that will be put into lunar orbit, called Gateway," she said. "The power and propulsion element (PPE) is similar to the service module for Orion, and provides the propulsion, power and communications systems for the spacecraft that will orbit the moon."

Space Flight Systems Director Bryan Smith shared a snapshot of decades of NASA accomplishments, from Apollo to the space shuttle, that have led to the Moon to Mars initiative. He answered questions and expanded on the importance of Gateway to establishing a sustainable presence on the moon and beyond.

"With the PPE and Gateway, we are creating a presence in the lunar area which others can then be part of, including international partners, commercial partners and the overall space economy."

Administrator Bridenstine then took center stage live from NASA Kennedy via NASA Television. He outlined NASA's new Moon to Mars approach for human space exploration and discussed the President's FY 2020 NASA budget proposal of $20.019 billion, including $882 million for Glenn.

"NASA's budget request is very good, and we have bipartisan support," Bridenstine said. "We're going to be able to accomplish more than we have ever been able to accomplish before."

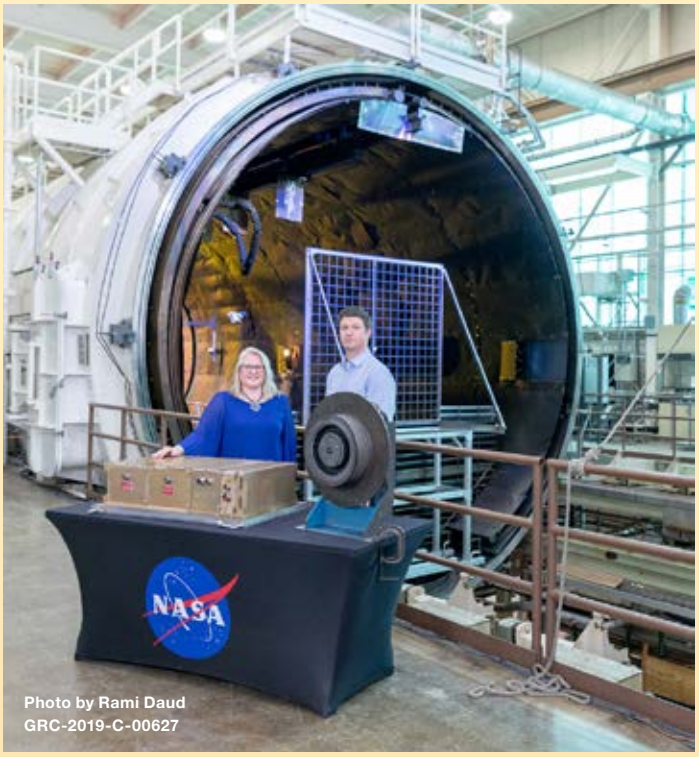

Photo by Rami Daud
GRC-2019-C-00627

Waters, left, and Jacobson took viewers live to the EPPL during Bridenstine's address.

Bridenstine discussed the agency's plans to lead a sustainable return to the moon and then onto Mars. He laid out why and what technologies are being developed to achieve this goal. To illustrate these technologies, Bridenstine broke from his address to speak live to NASA Johnson and with staff in Glenn's Electric Propulsion and Power Laboratory (EPPL).

Glenn's Deb Waters, Space Simulation Facility manager, and Dave Jacobson, chief of the Electric Propulsion Systems Branch, took viewers inside the laboratory, including the Vacuum Facility 6 chamber. They highlighted the importance of solar electric propulsion for deep space exploration missions with application to Gateway.

After the briefing, media and social media guests toured the Simulated Lunar Operations Laboratory, new Excavation Laboratory, EPPL and Stirling Research Laboratory.

By Doreen B. Zudell

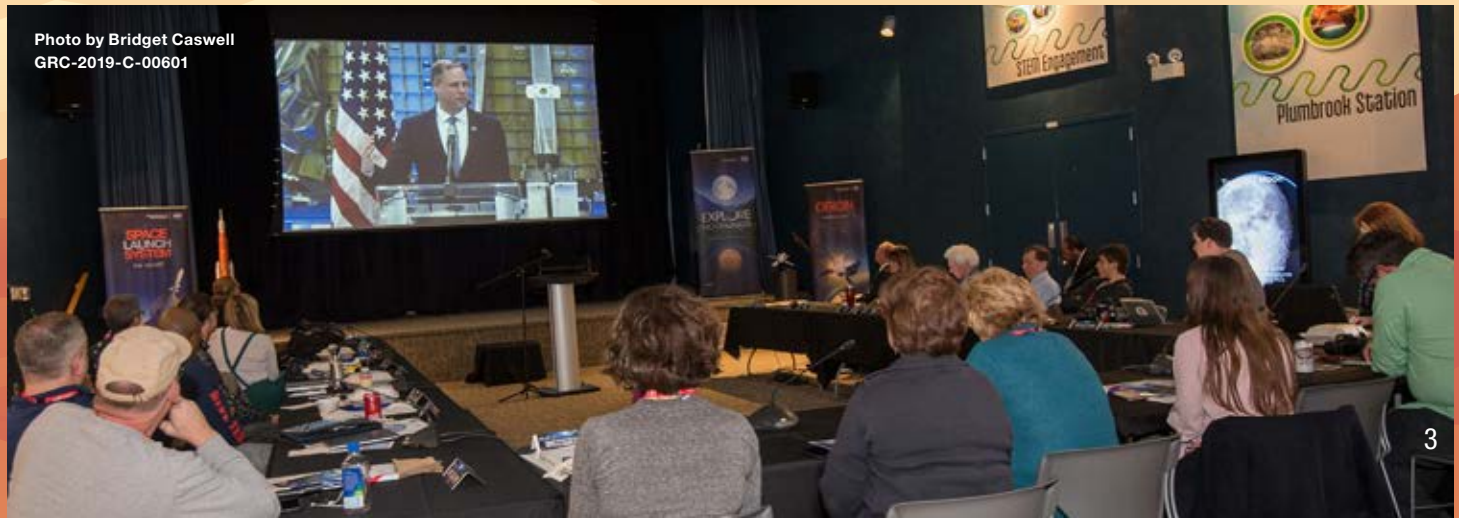

Photo by Bridget Caswell
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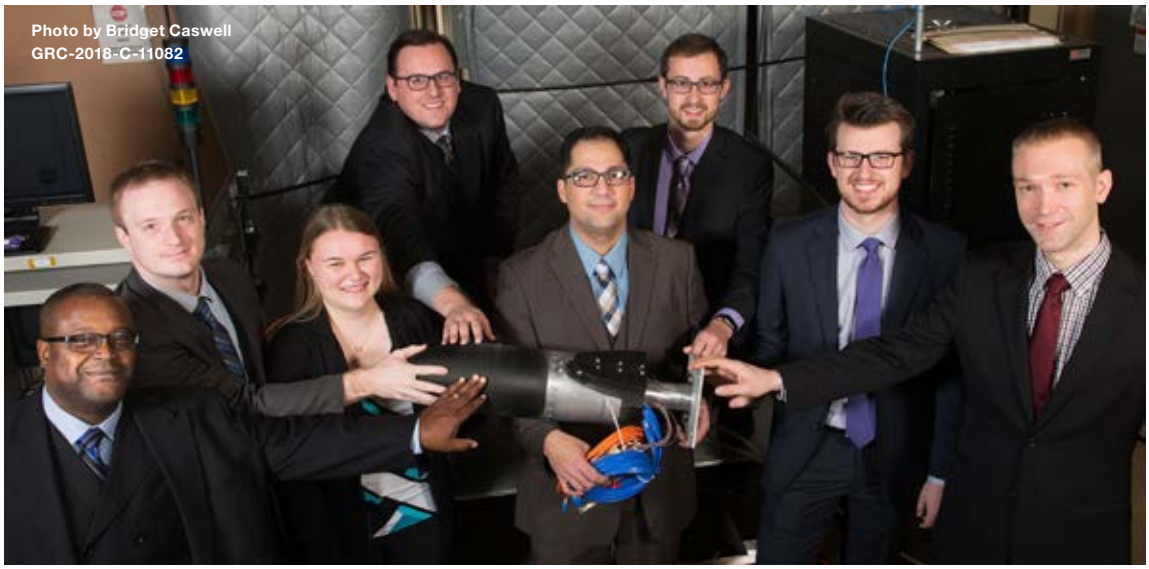


Team members with the X–57 fully built hardware, from left to right, Mike Garrett, Andrew Smith, Susanah Kowalewski, Matt Granger, David Avanesian, John Maroli, Sean McCormick and Wes Miller.

Glenn Team Keeps X–57 Cool

NASA is preparing to explore electric-powered flight with the X–57 Maxwell. This is the first all-electric X-plane that will be flown to validate and demonstrate the benefits of distributed electric propulsion for the future of aviation.

The goal of the X–57 is to demonstrate a 500-percent increase in high-speed cruise efficiency, zero in-flight carbon emissions and flight that is much quieter for the community on the ground. The X–57 will undergo three configurations, with the final configuration to feature 14 electric motors and propellers (12 high-lift motors along the leading edge of the wing and two large wingtip cruise motors).

A Glenn team, led by David Avanesian, Diagnostics and Electromagnetics Branch, was tasked with designing, building and environmentally testing one of the 12 high-lift motor inverters. The major technical challenge was to build a highly compact 11-kW power system that can only use passive air cooling in order to maintain a 1-kg weight limit.

"The biggest challenge when designing high-power systems is how to eliminate heat that is produced during operation. Our team was also constrained in terms of weight and volume," said Avanesian.

To solve heat problems while maintaining weight and volume limits, the team designed, built and tested a 98.2-percent-efficient power system with custom-designed aluminum skin that fits directly into the wing nacelle of the X–57 plane. The custom design is within a 1-kg weight limit and did not alter the outer mold line of the plane, providing a plug-and-play solution for the X–57 project.

In order to verify the thermal solution, the team conducted extensive environmental tests. This included 40 hours of thermal cycles in the Fuel Cell Testing Laboratory and wind tunnel tests (both thermal and altitude flight conditions) in the Engine Research Building's CE–22 test cell.

"All tests showed great performance of the power system," Avanesian said. "The experimental hardware and all associated design files were sent to NASA Armstrong (X–57 project lead) for them to continue working towards using Glenn's design for the X–57 first flight."

Senior Staff Changes at Glenn

Watkins

Hartline

Kearns

Three Glenn leadership changes became effective in March:

Associate Center Director **Janet Watkins** has been selected to serve as the Mission Support Future Architecture Program (MAP) Project Manager for the Office of the Chief Information Officer (CIO) at Headquarters (HQ). She leads the CIO MAP effort for the agency.

Tom Hartline, previously the Director of Facilities, Test and Manufacturing, is now Director of the Exploration Systems Development (ESD), Safety and Mission Assurance (SMA) at HQ. He oversees SMA integration across the Orion, Space Launch System and Exploration Ground Systems programs, as well as manages ESD SMA resources, product development, requirement development, quality management and SMA risks. Hartline also manages major milestone and flight certification reporting of SMA product readiness.

Joel Kearns is Glenn's new Director of Facilities, Test and Manufacturing. Kearns previously served as Glenn's Deputy Director of Space Flight Systems. He now leads the efforts for all facility infrastructure and maintenance, and major test facilities at Lewis Field. Kearns also oversees the flight research aircraft, manufacturing facilities and the environmental management program.

Dr. Meador

Dr. Meador: ACS Polymer Chemistry Fellow

Dr. Mary Ann Meador, Materials Chemistry and Physics Branch, has been selected a fellow by the Division of Polymer Chemistry of the American Chemistry Society (ACS). Meador is recognized for contributions to advances in the field of polymer science through her scientific accomplishments and service to the profession.

Melcher

AIAA Honors Melcher for Distinguished Service

The American Institute of Aeronautics and Astronautics (AIAA) Intelligent Systems Technical Committee has presented **Kevin J. Melcher** with an AIAA Certificate of Merit for Distinguished Service during the SciTech Forum, held Jan. 7 to 11. Melcher, who is Glenn's Intelligent Control and Autonomy Branch chief, was recognized for his work and leadership as the conference planning committee chair and the 2018 SciTech technical forum chair for the AIAA Information Systems Group.

Exploring Applications of Biomimicry

Could the wood frog's ability to metabolically create its own "antifreeze" to survive cold temperatures of northern America be relevant to human exploration of distant worlds or help us find life under the frozen surface of Europa?

NASA Glenn scientist Bryan Palaszewski, standing, and Clara do Amaral, assistant professor of biology at Mount St. Joseph University in Cincinnati, seated, far right, offered food for thought during the presentation "Baby It's Cold Outside—How Organisms and Nature Manage the Winter."

Held at the Cleveland Museum of Natural History (CMNH) on Feb. 27, the program was the first of a five-part series called Solution Evolution. The series encourages the understanding of how we might apply research of natural organism functions to real-world problems.

The CMNH, in partnership with Great Lakes Biomimicry and Glenn, is sponsoring the monthly series. Vikram Shyam, principal investigator for a Glenn team that collaborates to explore applications of biomimicry, moderated the discussion that followed.

By S. Jenise Veris

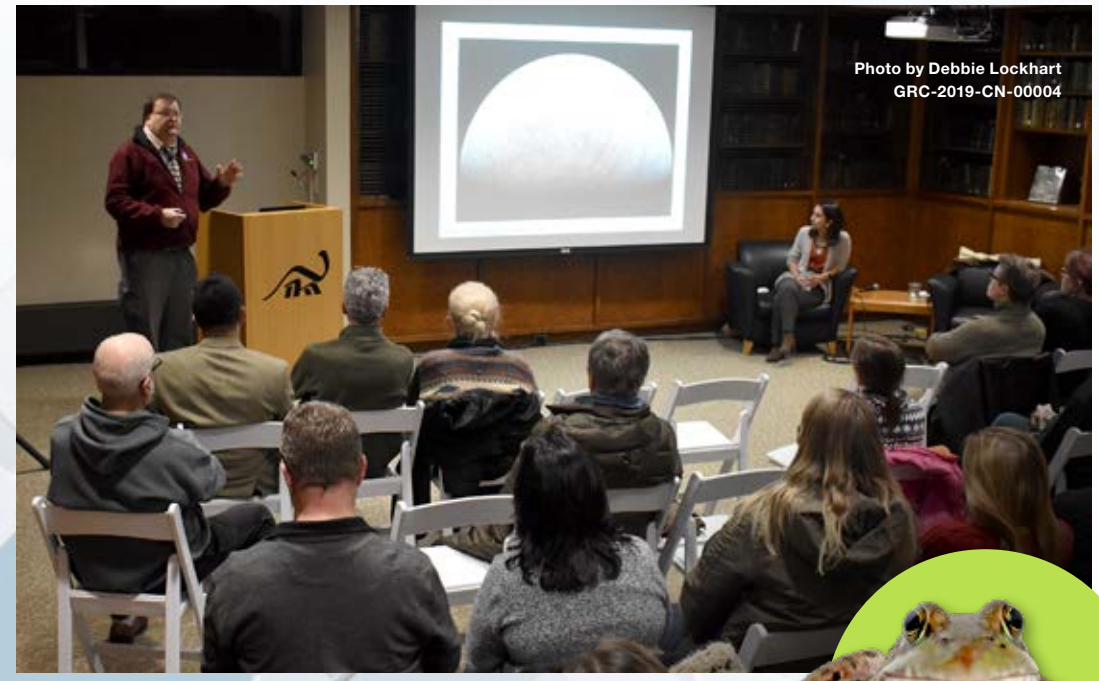
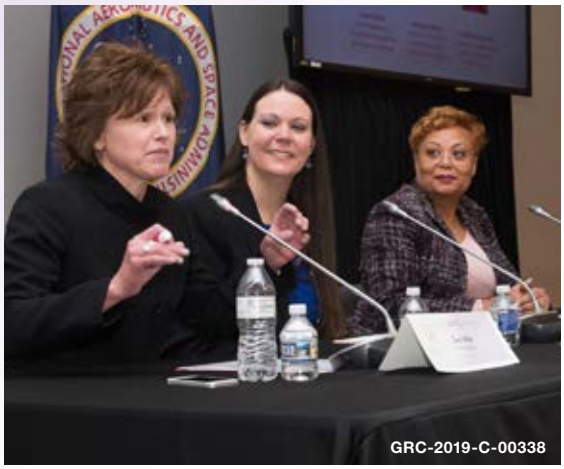


Photo by Debbie Lockhart
GRC-2019-CN-00004

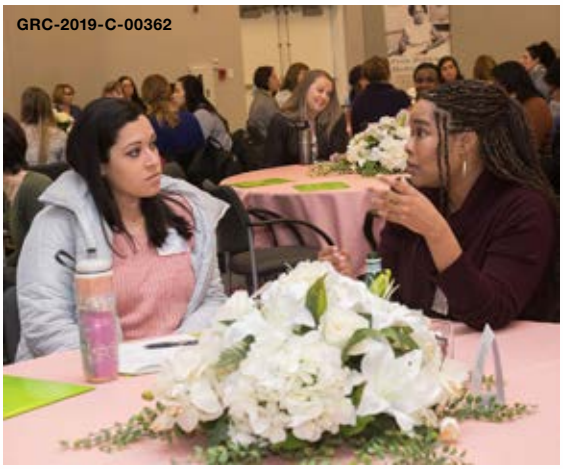
Workshop Connects Women, Ignites Enthusiasm

Glenn's annual Women IGNITE workshop, held March 6 at Lewis Field, centered on the theme "IGNITE Your Destiny" and provided a forum to motivate, connect and celebrate women.

Pictured, left to right: Glenn Deputy Director Dr. Marla Pérez-Davis; NASA Chief Information Officer Renee Wynn; Federal Women's Program Manager Nola Bland; and Diana C. Starks, Federal Reserve Bank of Cleveland. Bland led the event while the three panelists participated in a discussion on Empowering Women and Building Your Professional Coalition of Allies.



A panel discussion on Becoming the Authentic Leader You Envision, includes, left to right, Carol Miller, American Greetings; Harmony Myers, NASA Safety Center; and Dr. Mildred Edwards, ME Executive Consulting, LLC.



Ashley Cantor, left, and Lauren Crawford, right, Office of Diversity and Equal Opportunity, share their views during a tabletop discussion. They were among approximately 170 attendees who participated in the event.

The capacity-filled workshop addressed the needs of women—at any level of leadership—to help build new skills, open their minds to different perspectives and make lasting connections. The event, hosted by Glenn's Human Capital Development Division, included interactive table and panel discussions moderated by professionals in and outside NASA. Carrie Sechel, keynote speaker, also facilitated a workshop that provided participants with tools and exercises to get unstuck in order to maximize their value at work, home and in the community. A variety of vendors offered professional and personal resources.

Apollo Program Reflections

From October 2018 through December 2022, NASA will mark the 50th anniversary of the Apollo Program that landed a dozen astronauts on the moon between July 1969 and December 1972.

Here's a snapshot of the Apollo missions that flew during the month of April:

Apollo 13

DATE: April 11 to 17, 1970

MISSION: Intended to land on the moon

On the way there, the spacecraft had a problem and flew around the moon before turning home to land safely on Earth.

CREW: Lovell, Swigert, Haise

Apollo 16

DATE: April 16 to 27, 1972

MISSION: Landed on the moon

CREW: Young, Duke, Mattingly

To learn more about the Apollo program, visit **https://www.nasa.gov/mission_pages/apollo/index.html**

Observe Reserved Parking Signs

Reserved parking spaces, designated with signage, are strategically located throughout Lewis Field and Plum Brook Station. While reserved parking may seem inconvenient for some, these spaces are critical for people needing special accommodations.

In addition to familiar signs allocating space for government vehicles and people with disabilities, Glenn provides several types of reserved parking to assist staff and visitors in performing their jobs safely and effectively.

Reserved parking spaces identified with a permit number are available to individuals with severe disabilities and temporary medical conditions. Individuals must contact the Office of Diversity and Equal Opportunity (ODEO) to begin the reasonable accommodation request process. The duration of these spaces is decided on a case-by-case basis, but will not exceed a 3-year period. Individuals with a continued need must contact ODEO to reapply.

Glenn also offers specialized reserved parking spaces using color-coded signage. These apply to personnel in the areas of emergency and security, maintenance and operations, construction, mission, information technology, center logistics and senior leadership. Personnel using these spaces are often required to display coordinating placards on their rearview mirrors. The GRC75P (Space Management Reserved Parking Request) form is submitted to apply for these spaces.

"As with all parking laws and regulations at the center, employees and visitors are required to comply with reserved parking restrictions," said Tim Monk, Facilities Infrastructure Division. "Please be respectful to those who need these spaces to perform their jobs."

By Doreen B. Zudell

April Is Records Management Month

Your Work Matters, Your Records Count

Are you drowning under piles of paper on your desk, facing an overflow of documents and photos in filing cabinets and on your hard drive? Worried what will happen to your files when you retire?

If reviewing years (and years) of files to determine what to keep and what to throw out overwhelms you, NASA Glenn's Records Management Program can help. Staff members can answer any records management question you may have—from records appraisal to file plan development and everything in between.

Every person who works for NASA Glenn, whether a civil servant or contractor, is responsible for preserving agency records. Your responsibilities include creating and managing the records necessary to document your official activities.

"Records management is important because it keeps the Glenn legacy alive and prevents others from having to re-create research (assessments, drawings, etc.)," said Glenn's Records Manager and History Officer Anne Mills. "These records are a valuable resource that help us gain understanding and insights into what was done and why."

You may think your records have no value once you are gone, but the Records Management Program can attest to countless requests made for information on work performed decades ago.

A timely example of the value of the Records Management Program is a recent request for material relating to the 10-by 10-Foot Supersonic Wind Tunnel (10x10 SWT). Records Management thoroughly indexes materials and carefully stores them for efficient access, including old construction records.

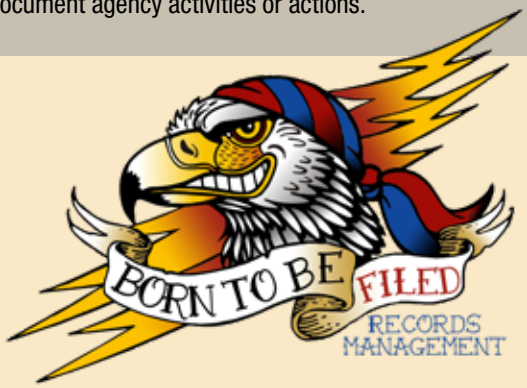
Records from when the 10x10 SWT was built helped the Wind Tunnel Repair team verify their approach in making repairs and helped them better understand the how and why of different components.

April is Records Management Month—a great time to review your papers and electronic files to determine their potential value for years to come. First, visit the Records Management website, **https://ltid.grc.nasa.gov/MediaServices/RecordsManagement**, and then contact Glenn's Records Management Office at 3–8715 for assistance to ensure NASA information assets are accessible and your contributions to NASA's history are preserved.

By Doreen B. Zudell

What is a record?

Records are defined as recorded information, regardless of physical form or characteristics, made or received by an agency of the U.S. government and needed to document agency activities or actions.



Glenn's Strategic Action Plan Now Available

The 2018 NASA Glenn Strategic Action Plan, which serves as a guide for the work we do today and tomorrow, is now available in an electronic format. The 2018 plan is the foundation on which our center will establish our direction, guide our activities, align our priorities and resources and measure our success.

The PDF file is available internally on the Director's Corner website—under *Center Activities* tab, and externally on our Glenn public portal—*About Us* tab, *Learn About Glenn* box.

AWARDS

Two Employees Are 2019 BEYA Winners

Thomas

Tolbert

Fransua Thomas and **Carol Tolbert** were recognized during the 2019 Black Engineer of the Year Awards (BEYA) STEM Global Competitiveness Conference. BEYA categories recognize exceptional careers in government and industry, and actions that have energized both corporations and communities alike.

Thomas, a materials research engineer in the Mechanisms and Tribology Branch, received the Community Service in Government Award at the BEYA Gala. Earlier during the Technology Recognition Luncheon, Tolbert, an aerospace technologist/engineering project manager in the Space Science Project Office, received a Science Spectrum Trailblazer Award.

The event is hosted by the U.S. Black Engineer and Information Technology magazine, the Council of Engineering Deans of the Historically Black Colleges and Universities and Lockheed Martin Corporation.

PROMOTIONS

Weaver

Weaver New PTC Manager

Harold "Hal" Weaver has been selected Plum Brook Station Propulsion Test Complex (PTC) manager. Weaver has extensive experience working in the PTC over the past 10 years: first as the test chamber's engineering lead and more recently as the test program manager.

RETIREMENTS

Capelety

Lerch

Michael W. Capelety, Quality Engineering and Assurance Branch, Program and Project Assurance Division, retired March 1, 2019, with 40 years of federal service, including 36 with NASA.

Brad Lerch, High Temperature and Smart Alloys Branch, Materials and Structures Division, retired March 30, 2019, with 31 years of NASA service.

Dan Vento, Space Science Project Office, Space Flight Systems Directorate, retired March 3, 2019, with 39 years of NASA service.

IN APPRECIATION

Dear Glenn colleagues and friends,

Thank you all for a great 35+ years at NASA.

My retirement events were amazing, including the kind words about my impact on NASA projects AND people. A special thanks to Stacy Alcorso, Susan Motil and others for great planning and execution. Also, your notes in my retirement book and the Paulie story were fantastic.

Please help me stay in touch.

—Ann Over

Attention Golfers

Glenn's mixed golf league is looking for men and women of all skill levels to join the league, which golfs on Tuesday evenings at the Creekwood Golf Course in Columbia Station. Civil servants, support service contractors, retirees, spouses, family and friends are welcome.

POC: Richard Manco, 3–6054

Upcoming Center Events

HARVEST FOR HUNGER

NASA Glenn Campaign

Now through May 10

Let's beat last year's donations of 1,810 pounds of food!

Lewis Field drop-off boxes are located throughout the center and in the cafeteria. Plum Brook Station drop-off boxes are in the Engineering Building, In-Space Propulsion Facility and Space Environments Complex.

Food collected will be donated to the Greater Cleveland Food Bank and the Victory Kitchen in Sandusky.

POC: Christina Koleno, 3–6874, Lewis Field, and Geneva Biglin, 4–3344, Plum Brook Station

Earth Day Kickoff

Thursday, April 18

12:30 to 1:30 p.m. • Briefing Center (Building 8)

This year marks 50 years from when the Cuyahoga River caught on fire and helped spark a national environmental movement. Come hear about a number of exciting events taking place in and around Cleveland this spring and summer in celebration of 50 years of environmental stewardship.

Guest speaker, Mary Grodek, West Creek Conservancy, will give a brief history of Earth Day and the Cuyahoga River. She will highlight the events coming up this year, including lectures, art and photo displays, live music and walking tours. Hope to see you there!

POC: David Smith, 3–5109

Cuyahoga River fire on June 22, 1969.

ATHLETIC SHOE FITTING

Staff from Fleet Feet Shoes will be at Glenn's Fitness Center on Tuesday, April 16, from 10 a.m. to 4 p.m. A variety of brands and styles will be available for purchase. All employees receive 15 percent off shoes, insoles and socks.

POC: Fitness Center, 3–6313

GSEL MOBILE LIBRARIAN

The Glenn Science and Engineering Library (GSEL) Mobile Librarian will be visiting building 23 from April 23 to May 2 and building 49 from May 7 to 16 from 1 to 3 p.m. A Glenn reference librarian will be ready to assist employees with subject searches, finding specific books and articles and other information needs on the spot.

POC: Robin Pertz, 3–5776

OUTDOOR SIREN TESTING

The Emergency Management Office staff will conduct a mass notification "voice" test at building 87 on Wednesday, May 1 at Lewis Field. An audible siren test will be conducted using the "shelter and aid stations" tone on Saturday, May 4.

POC: Allen Turner, 3–6826

NATIONAL DAY OF PRAYER

The NASA Glenn Prayer Group invites all members of the Glenn community to join them for a Christian observance on Thursday, May 2, at 7:30 a.m. and during the lunch hour. This year's theme is "Love One Another." For locations and details see Today@Glenn or type "Prayer" in the WING Transporter.

POC: Dale Mortensen, 3–6823

IFPTE LOCAL 28, LESA MEETING

LESA will hold its next membership meeting, Wednesday, May 8, noon, in the Glenn Employee Center's Small Dining Room.

Deadline for next calendar section is **April 17, noon**. News and feature stories require additional time.
NASA Glenn Employees: For more calendar information, visit **https://wing.grc.nasa.gov/event-calendar/**.

National Aeronautics and Space Administration

John H. Glenn Research Center

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Cleveland, Ohio 44135

Plum Brook Station
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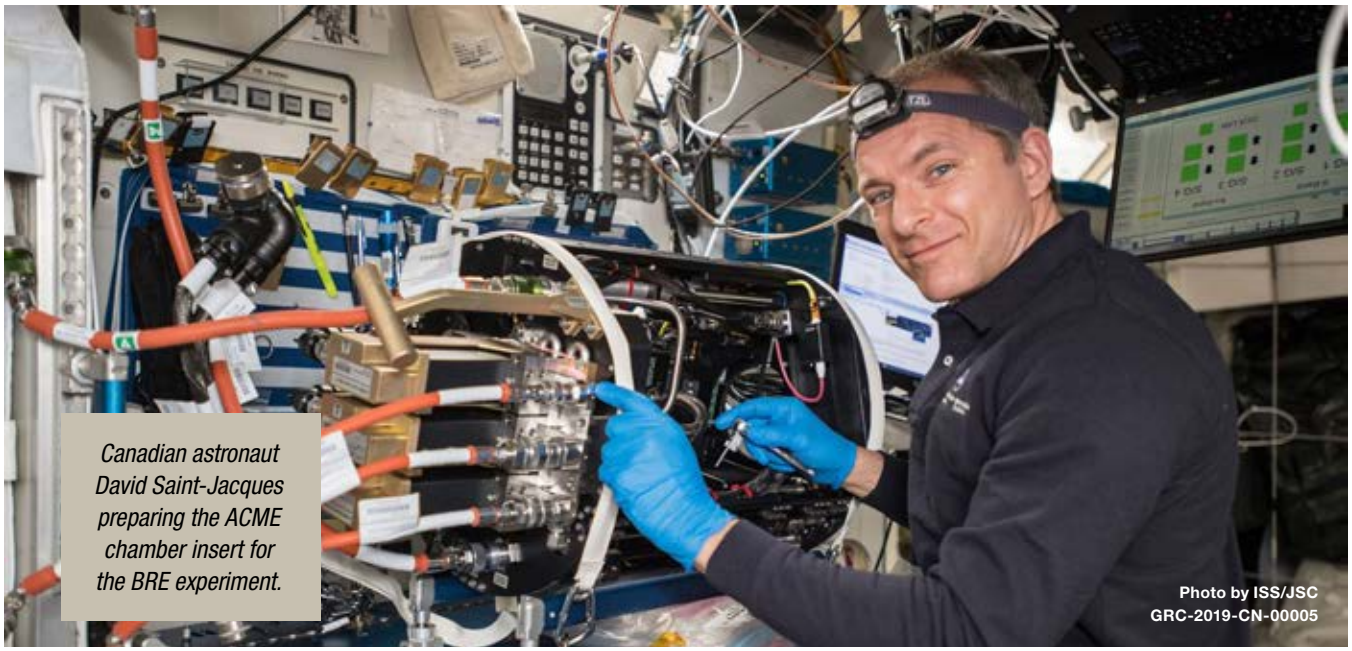
Sandusky, Ohio 44870

www.nasa.gov

Read AeroSpace Frontiers online at http://www.nasa.gov/centers/glenn/news/AF/index.html.

ACME Update: BRE Experiment Fired Up

The Burning Rate Emulator (BRE) experiment, one of six experiments of the Advanced Combustion via Microgravity Experiments (ACME) project, became operational on Feb. 8.



Canadian astronaut David Saint-Jacques preparing the ACME chamber insert for the BRE experiment.

Photo by ISS/JSC
GRC-2019-CN-00005

The ACME hardware resides inside the Combustion Integrated Rack (CIR) aboard the International Space Station (ISS) and is remotely controlled from Glenn's ISS Payload Operations Center. The experiment focuses on understanding the conditions under which materials are flammable in spacecraft by matching key parameters of flames from gaseous fuel with those of flammable materials such as plastics. BRE seeks to understand flame extinction and the conditions under which the flames become unsteady and extinguish.

"Later this month, we should be setting up for the fourth experiment, Flame Design," said Dennis Stocker, ACME Project scientist, "Although, we won't be done with BRE yet, we will alternate between experiments so that the investigators have a chance to study early results and use that knowledge to optimize their second round of testing."

By S. Jenise Veris

Emergency and Inclement Weather Lines

Lewis Field: 216–433–9328 (WEAT)
Plum Brook Station: 419–621–3333

Connect With Glenn