National Aeronautics and Space Administration

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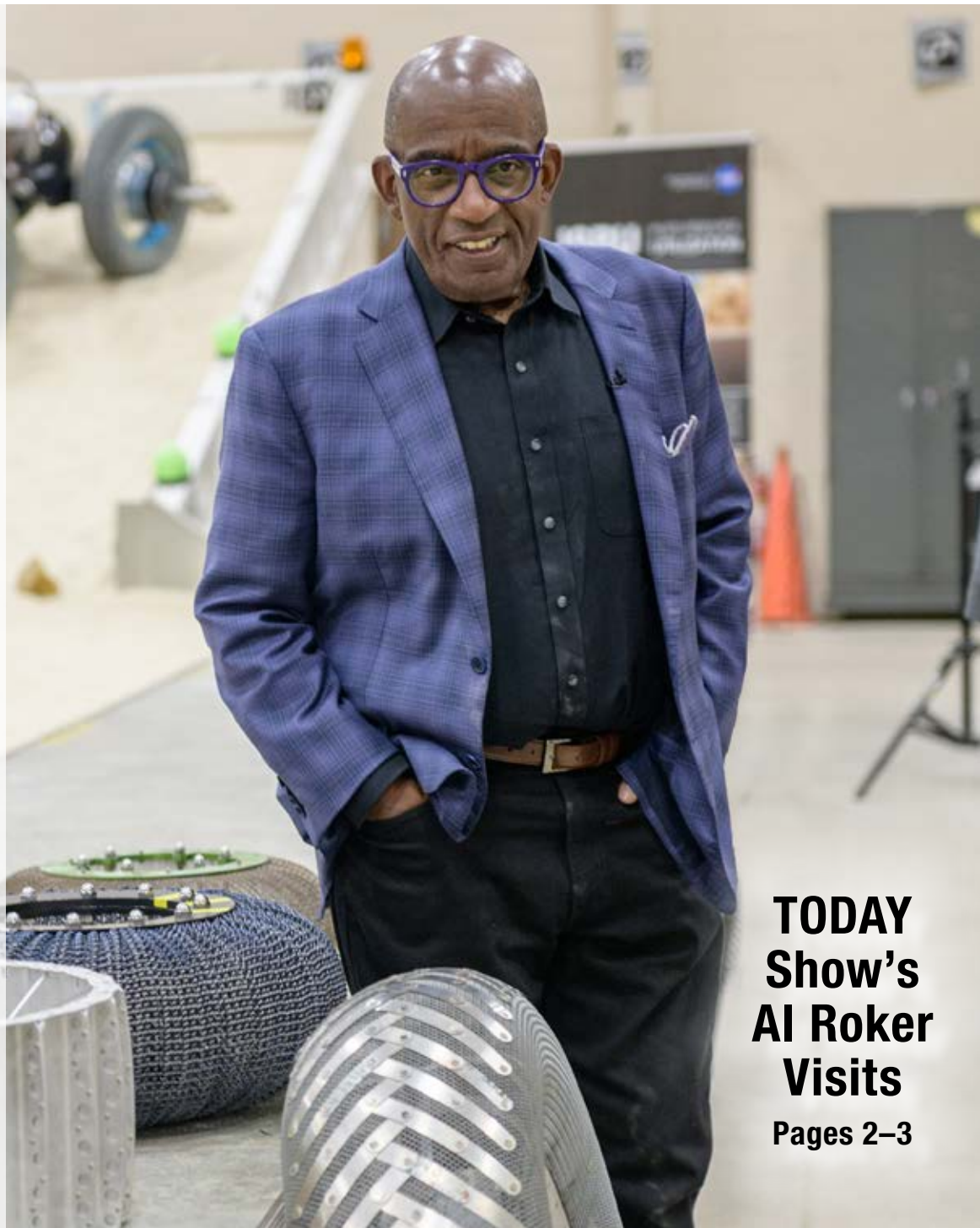

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Strengthening our Safety Culture

In response to your feedback from the 2020 Safety Culture Survey, we have been taking actions to further strengthen our safety culture across the center. Specifically, we improved safety reporting for increased awareness by adding safety links on the GRC WING and COVID–19 websites, as well as the safety bulletins. We are encouraging early career employee engagement in safety processes such as serving on safety committees. I further encourage everyone to engage in a safety activity such as serving on a mishap investigation, supporting a job hazard analysis, or reporting a hazard. I am also proud that 93% of our supervisors have completed safety culture training, exceeding the 90% center goal!

Strengthening our safety culture is vital to 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 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.

Editor: **Doreen B. Zudell**, ATS, 216–433–5317

Assistant Editor: **Adam Schabel,** ATS, 216–433–2888

Design: **Rhys Sampson**, ATS

Managing Editor: **Kelly R. DiFrancesco**

Circulation: **Angela Williams**, ATS, 216–433–8921

NBC's TODAY Show Features NASA Glenn

During a stop in Northeast Ohio on May 5, TODAY forecaster and co-host Al Roker swung by Lewis Field. He toured the Simulated Lunar Operations (SLOPE) Laboratory, including the Advanced Planetary Excavator. He also sat down with Center Director Dr. Marla Pérez-Davis to discuss the center's work in returning boots to the Moon and advancing aviation.

The visit was part of the TODAY Show's Reopening America series. Roker traveled to cities across the country to learn more about what's being done to get America back on track by talking to people and businesses making a difference in their communities.

The Glenn visit aired on May 13. TODAY reaches more than 5 million people every morning through its broadcast, and millions more through its digital and social media platforms. For more information, please visit https://go.nasa.gov/3fNjOoD.

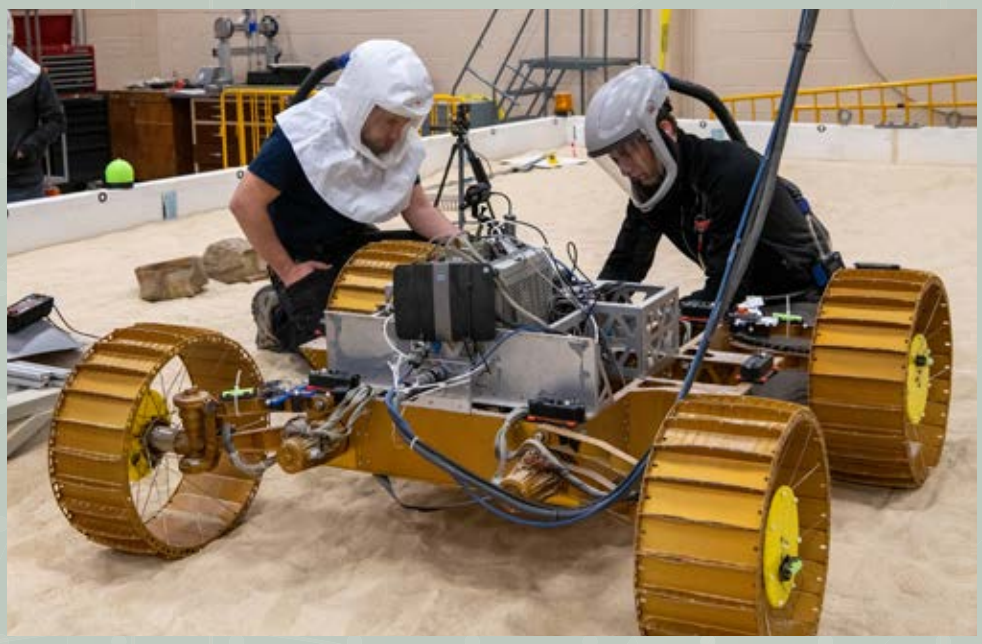
GRC-2021-C-01411 **Photo by Jef Janis**

Dr. Pérez-Davis, right, and Roker discuss the center's work.

VIPER Hits the SLOPEs

Before NASA's next lunar rover paves the way for long-term human exploration of the Moon, it must first pass a series of rigorous mobility tests along the banks of Lake Erie.

Glenn's Simulated Lunar Operations (SLOPE) Laboratory is home to multiple sandboxes that mimic the lunar and Martian terrain to evaluate the traction performance and limitations of current rover designs. As rovers become more sophisticated and complex, a team at the SLOPE Laboratory is adding unique capabilities to help simulate terrain conditions and test rover performance prior to launch.



GRC-2021-C-00555 Photo by Bridget Caswell

Glenn's Alex Schepelmann, left, and Ames Research Center's Antoine Tardy, prepare VIPER for testing in the SLOPE Laboratory.

Recently, the team at Glenn used a test version of NASA's Volatiles Investigating Polar Exploration Rover (VIPER) to evaluate and fine-tune a newly installed OptiTrack motion tracking camera system. This extremely accurate set of 16 cameras looks for infrared light produced by light-emitting diodes (LEDs) inside small white balls, called markers, installed across the lab and on the test vehicles.

This allows engineers to precisely measure real-time movement and compare it to existing computer models to determine if the vehicle is performing as expected. It also creates detailed 3D animations as a rover travels across the simulated terrain, which are critical to engineering teams during testing and to inform future rover designs.

"The OptiTrack gives us the ability to track large and small vehicles and produce excellent data with a very high level of accuracy, down to around one millimeter," said Erin Rezich, lead test engineer at the SLOPE Laboratory. "Whether on the Moon or Mars, a rover's path holds a lot of unknowns, so the more testing and the higher quality data we can produce, the better understanding we'll have in terms of vehicle performance."

With the new SLOPE systems now installed and verified, the team is ready for the newer, higher fidelity VIPER engineering model to arrive this fall for final mobility testing. This final evaluation will collect data to be used in the rover's prelaunch reviews before it catches a ride to the Moon in late 2023 under NASA's Commercial Lunar Payload Services initiative.

VIPER is helping to further the agency's Artemis program because it is humanity's first opportunity to robotically explore and map the presence of water ice on the lunar surface.

"Having never sent a rover to the lunar south pole, we must be ready for harsh, relatively unknown conditions," said Yajaira Sierra-Sastre, project manager for VIPER testing at Glenn. "SLOPE now provides several unique capabilities to help us understand mobility performance demands to ensure VIPER will be successful from the moment it first rolls off the lander."

By Jimi Russell

GRC-2021-C-01357 Photo by Jef Janis

Rezich, right, shows Roker many different rover tires, including Glenn's innovative shape memory alloy tires for Mars.

On the Cover:

During his stop at Glenn, TODAY Show's Al Roker visited the Simulated Lunar Operations Laboratory and learned about tire performance testing for the Mars terrain.

Photo by Jef Janis
GRC-2021-C-01368

ARMD AA Connects Virtually with Glenn Workforce

Pearce Provides Aeronautics Research Overview

Despite reductions in passenger air travel in 2020, U.S. aviation remained an integral part of the nation's economy by delivering cargo (goods) across the country—including COVID–19 vaccines. Meanwhile, domestic passenger travel is on the rise in 2021.

On April 29, after Center Director Dr. Marla Pérez-Davis introduced Aeronautics Research Mission Directorate (ARMD) Associate Administrator (AA) Robert Pearce, he shared this positive news and more during his virtual visit to Glenn. The day included an all-hands meeting with Glenn employees, as well as several virtual meetings with leadership, research updates, tours, and a discussion with Early Career Hires.

During his all-hands meeting, Pearce provided an ARMD overview, including goals relating to NASA's global, sustainable, and transformative vision for aviation in the 21st century. He recognized Glenn's achievements during a year of challenges and uncertainty.

"Thank you for the tremendous amount of work that has been done in the virtual environment," he said.

Pearce introduced senior members of his leadership team and welcomed Glenn's Aeronautics Director Tim McCartney and Deputy Mary Wadel. He stressed that McCartney and Wadel, along with aeronautics research directors across the agency, help manage NASA's overall aviation portfolio.

Pearce also thanked staff involved in the Return to Onsite Work (RTOW) teams, and the expertise of the Glenn workforce in achieving significant aviation milestones in the current environment.

"Your focus on safety and returning to work and forwarding ARMD mission-critical activities has been unprecedented," Pearce said. "Thank you for your countless hours spent developing RTOW packages and modifications."

GRC-2021-C-01342 Photo by Marvin Smith

Joe Haglage, right, describes the upcoming NASA/GE Altitude Integrated Test at the NASA Electric Aircraft Testbed (NEAT) at Glenn's Neil A. Armstrong Test Facility to Pearce. This test supports Glenn's work in reducing technical risk for planned flight demonstrators and vehicles entering service in the 2030s. Because of the importance of altitude results and the worldwide competitiveness in megawatt electrified propulsion, this work was approved as mission critical through the RTOW process.

He then highlighted some specific accomplishments and attributed their success to Glenn's workforce:

- Advanced Air Transport Technology W–7 Test team for the NASA/Pratt & Whitney High-Speed Small Core Compressor Phase 2 test.
- 8- by 6-Foot Supersonic Wind Tunnel team's successful run of the renovated tunnel.
- Integrated Armstrong, Glenn, ESAero X–57 team for efforts that led to major events.
- Transformative Tools and Technologies Smart V–G team for progress made in the design of two unique shape memory alloys to actuate vortex generators on the wing on Boeing's 2020 ecoDemonstrator.

At the conclusion of his presentation, Pearce conducted an extended question-and-answer session.

By Doreen B. Zudell

GRC-2021-C-01316 Photo by Marvin Smith

Pearce, Dr. Pérez-Davis, and McCartney highlight Glenn's role in NASA's Aeronautics mission.

Survey Confirms Employee Engagement Yields Positive Results

It is not by chance that NASA has been named the "Best Place to Work" in the federal government (among large agencies) for the past 8 years by the Partnership for Public Service. Using the Federal Employee Viewpoint Survey as a focal point for guidance, over time NASA has developed a positive work culture with a high level of employee engagement through deliberate, proactive initiatives.

Glenn's 2020 Federal Employee Viewpoint Survey continued that trend, showing positive results across most categories. The results confirmed employee engagement and illustrated that morale is high among employees at Glenn. The survey was administered to civil servants and showed a connection between employee experience and their connectedness to NASA's mission.

Glenn's employee participation rate rose nearly 5% from 2019 to 2020. Over the past few years, Glenn has been consistently above the federal government's average in most categories within the survey.

All questions in the percent positive category—which is the combined percentage of individuals responding "Strongly Agree" or "Agree"—increased or stayed the same, while 30% of questions increased by 5% or more. This result is considered statistically significant. In the percent negative category, 97% of questions decreased or stayed the same.

"The Glenn Research Center's survey results are overwhelmingly positive and illustrate that Glenn is moving in the right direction," said Steve Dykeman, director of the Human Resources Office at Glenn. "We progressed by leaps and bounds from what we scored in 2019."

Among the percent positive questions, 11 questions had a 5% or greater increase from 2019 to 2020. The largest percentage point gains were seen in questions asking how the workforce views leadership at Glenn.

Two areas saw a greater than 10% increase from 2019 to 2020. A question asking if employees feel that differences in performance are recognized in a meaningful way saw a 17% increase. Another asking if senior leaders are demonstrating support for Work-Life programs saw an 11% increase.

Glenn also performed well in the COVID–19 pandemic category. Out of six questions, all but one was equal or better than the NASA average, with one question being a single percentage point below the NASA average. Dykeman believes this demonstrates that NASA senior leadership has been sensitive to the concerns that have arose as a byproduct of the pandemic.

Dykeman and his team are working towards sustaining the progress being made at Glenn by implementing action plans. While action plans can have a negative connotation, he wants them to be viewed as a positive.

"We're creating action plans so that we can sustain the great work and glean the best practices that are happening in each of the different directorates to share across the center," said Dykeman. "Each code is doing something different. However, all of them are doing something right."

By Adam Schabel

"Leaders Lead" reflects employees' perceptions of the integrity of leadership. "Supervisors" reflects the interpersonal relationship between worker and supervisor. "Best Places to Work" measures employee satisfaction and commitment.

GRC-2021-CN-00034

Graphic by Ronald Mullenax

Five Named in Leadership Positions


Cockrell


Garcia-Galan


Narvaez-Legeza


Dr. Noebe


Dr. Turner

During the virtual Center Update Town Hall on April 19, Dr. Marla Pérez-Davis announced the following senior executive service, science or professional, and senior leader positions.

Charles E. Cockrell has been selected for a 1-year detail, beginning in April, as Glenn's Associate Director for Strategy. He previously served as director, Office of Strategic Analysis, Communications, and Business Development, at NASA's Langley Research Center. Cockrell's NASA career started in 1990 and has included research, technology programs, flight projects, and line organizational leadership.

Carlos Garcia-Galan, on detail from NASA's Johnson Space Center, has been selected Orion European Service Module Integration Office manager. Garcia-Galan previously served as deputy manager of the Vehicle Integration Office, following other roles in Orion. He started his career at NASA in 1998 as a flight controller for the International Space Station.

Adabelle Narvaez-Legeza has been selected to senior-level chief engineer for Aeronautics, effective Jan. 31. Narvaez-Legeza has 30 years of experience at Glenn, serving in technical leadership positions and critical projects across various mission directorates, most recently with Aeronautics. She has advised senior management officials and technical leaders across the center on adequate technical management and systems engineering.

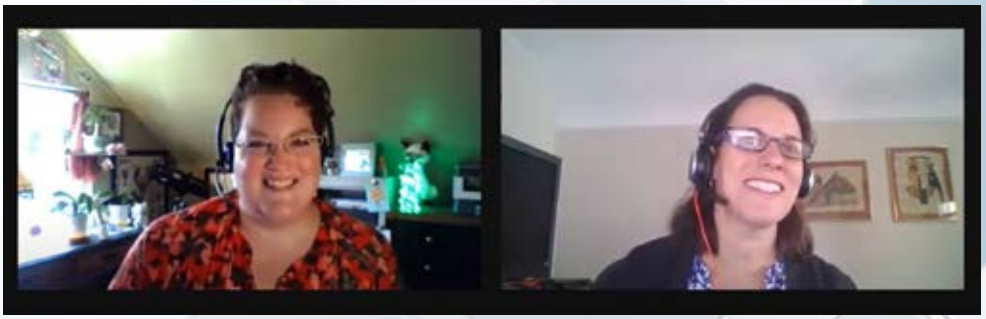
Dr. Ronald Noebe has been selected as senior technologist for Advanced Materials Characterization, effective Feb. 14. Noebe has over 33 years of experience at Glenn, serving in a variety of individual contributor and technical leadership positions in materials processing, modeling, characterization, and application development.

Dr. Mark G. Turner has been selected as senior technologist in Aeropropulsion, effective Feb. 1. Turner joins Glenn with a background in industry and academia and has had many interactions with NASA. He most recently served as professor and associate department chair in Aerospace Engineering at the University of Cincinnati.

NEWS AND EVENTS

NASA Achievements Highlighted at Science Festival

The 2021 COSI (Center of Science and Industry) Science Festival returned in a digital format for the second straight year, May 5 to 8. The number of presenters and events decreased from last year's festival to enhance the overall experience for attendees. NASA led six events, with presenters from Glenn. Amy Hiltabidel and Jeanne King, Technology Transfer Office, showcased NASA spinoffs in communication and medicine. Dr. Yajaira Sierra-Sastre, Space Science Project Office, discussed roving on the Moon and Mars. She highlighted upcoming robotic missions now that the Perseverance rover made it to the red planet.



GRC-2021-CN-00035 Photo by Adam Schabel

Hiltabidel, left, and King showcase NASA's spinoffs in communication and medicine.

NASA Invites Small Businesses to Make a Big Impact

Being a small company does not limit opportunities to do business with NASA. On May 4, Glenn's Office of Small Business Programs hosted an event to share this message and grow relationships with small enterprises. Celebrating 80 Years of Pushing Boundaries and Breaking Barriers: The Small Business Connection at GRC virtual summit ensured small businesses have the information and opportunities to compete for contracts. Glenn subject matter experts shared information about current procurement opportunities as well as plans for space, technology, and Earth Science programs and initiatives. To learn more about NASA's small business program at Glenn, contact Small Business Specialist Eunice Adams-Sipp at eunice.j.adams-sipp@nasa.gov.

GRC-2021-C-01464 Photo by Jordan Salkin

Subject matter experts provide small businesses with information on opportunities to compete for contracts.

AAPI Event Shows Diversity and Inclusion Benefits All

The Asian American and Pacific Islander (AAPI) Heritage Event on May 12 celebrated the contributions of AAPI employees while highlighting the theme: Advancing Leaders Through Purpose-Driven Service. Stephen Shih, NASA's associate administrator for Diversity and Equal Opportunity, led the discussion following a warm introduction from Center Director Dr. Marla Pérez-Davis.

Shih stressed how NASA's mission, which emphasizes the use of collaboration and teamwork, leads to contributions being made to society that benefit all. Selflessness, inclusion, and diversity are important components that should be at the forefront of everyone's minds daily, according to Shih. In doing so, an environment that fosters inclusivity and equity can become commonplace in society.

Glenn's Office of Diversity and Equal Opportunity, in partnership with the Asian Pacific Islander Advisory Group, sponsored the event.

Shih

FEB Awards Honor Service to Job and Community

Twelve NASA Glenn employees received the Federal Executive Board (FEB) "Wings of Excellence" Award during the virtual Awards and Recognition Luncheon on May 19. The award recognizes those employees whose outstanding performance on the job or in the community has been an inspiration to others and/or brought credit to the federal service. Congratulations to the following Glenn honorees:

Carol Brown, Office of Chief Information Officer, oversees Glenn's Privacy and Information Protection Program services portfolio. Under Brown's leadership, Glenn has achieved numerous sensitive data risk mitigations, executed Cybersecurity Awareness campaigns, and improved sensitive data management processes.

Jim Burke, Office of Chief Counsel, is a skilled litigator and procurement attorney. He has successfully assisted NASA in the acquisition of over $1 billion of goods and services. Burke's expertise is routinely sought for high-visibility procurements. He serves as the lead attorney for the Artemis Lunar Gateway Power and Propulsion Element.

Rochelle Gallagher, NASA Safety Center, has demonstrated outstanding leadership as NASA's Safety and Mission Assurance Technical Excellence Program (STEP) 2020 program manager, supporting the NASA Safety and Mission Assurance community. She also contributed to the community by developing NASA's Rocket U and NASA's Women in STEM Leadership Development Programs.

Louis R. Galmarini, Safety and Mission Assurance Directorate, has distinguished himself in assuring workplace fire and life safety criteria exist to prevent injury to employees, customers, and center guests. He showed exemplary leadership, reducing the number of overdue facility discrepancies by more than 60%. He also reaches out regularly to organize community events.

Natalie L. Henrich, Center Operations Directorate, has successfully coordinated critical support services that enable mission essential activities at NASA Glenn. As the point-of-contact for the Logistics and Technical Information services during the pandemic, she provides the resources employees need to perform operations on-site safely and successfully.

Charles "Chas" Hoff, NASA Safety Center, has provided outstanding leadership to advance the technical capabilities of the NASA Safety Center (NSC). His efforts have been instrumental in establishing the NSC as a trusted and innovative partner in several initiatives, including the Enterprise Video Content Delivery Network and Microsoft HoloLens 2 projects.

Kelly Ison, Office of Technology Incubation and Innovation, develops methods and processes to support directorate programs. She has implemented innovative approaches in the NASA Space Technology Research Fellowship Program impacted by mandatory telework conditions. Ison developed alternate plans to support graduate students' virtual technology experiences and transitioned over half of the fellows to complete experiences remotely.

Jonathan L. Kratz, Research and Engineering Directorate, is a researcher who regularly exceeds performance expectations. His innovative research in Turbine Electrified Energy Management will allow reduced aviation emissions. Kratz also helps coordinate Young Astronauts Day, and transformed several science, technology, engineering, and mathematics (STEM) activities to virtual events.

Gretchen Morales-Valle, Facilities, Test and Engineering Directorate, is an engineer in the Icing Research Tunnel supporting NASA's aeronautics aircraft safety research mission. She has a passion for


Brown


Burke


Gallagher


Galmarini


Henrich


Hoff


Ison


Kratz


Morales-Valle


Pappas


Staschiak


Windau

giving back to future generations by supporting student STEM career outreach activities. Morales-Valle is also a NASA Glenn NextGen Ambassador.

Elaine A. Pappas, Research and Engineering Directorate, is a program specialist and contracting officer's representative who administers several Glenn contracts in a highly capable and professional manner. She continually identifies and implements efficiencies. Pappas seeks opportunities to serve in the NASA mentorship program, Glenn Speakers Bureau, and other public outreach events.

Christine C. Staschiak, Environmental Management Office, led the development and implementation of the NASA Natural Resources Council for the protection and enhancement of NASA's natural resources. Under her leadership, the council exceeded its performance objectives and became a model for how agencywide environmental teams could be implemented to optimize investments in personnel and projects.

Angela D. Windau, Safety and Mission Assurance Directorate, has distinguished herself as a leading voice in communicating important and accurate information on the pandemic to employees. She has been instrumental in ensuring a safe workplace by leading a team of medical professionals performing contact tracing, overseeing vaccine administration, and developing resources to provide COVID–19-related material.

View the virtual event on YouTube at https://www.youtube.com/watch?v=tVd_vtj2448.

Trivia Tournament Celebrates Glenn's 80th Anniversary

A March Madness® Jeopardy Tournament was the latest activity in the center's ongoing effort to celebrate Glenn's 80th Anniversary. This series of events blended the popular components of these two programs for an action-packed, interactive, and fun-filled tournament of trivia.

Dozens of employees threw their hats into the ring for a chance to test their knowledge of Glenn and compete for bragging rights. Following the traditional Jeopardy!® format, the tournament allowed contestants to test their speed and accuracy in a head-to-head style contest against their peers.

"We were excited to see that so many employees participated in the tournament as contestants or spectators," said Daniel Brown, GRC 80th Anniversary planning team member and event organizer. "Our goal was to bring some energy to the activity and give people an opportunity to step away from their work routines and catch a game or check the standings. Given the challenges of working remotely, we wanted to bring the workforce together. I believe we succeeded."

GRC-2021-CN-00036 Photo by Daniel Brown

Players selected questions from a board similar to the television game show.

GRC-2021-CN-00037 Photos by Jef Janis

The final four contestants included, top row: Kwiat and Williamson. Bottom row: Wolter and Yanetta.

Qualifying rounds were conducted to narrow the participant field to the top 16 contestants, who then advanced to the official tournament. The Sweet 16® round kicked off the official tournament, with the Jeopardy!® question-and-answer format coming into play. The top eight contestants advanced to the Elite 8®.

The Final Four® on April 14 saw Rebecca Kwiat, Gary Scott Williamson, John Wolter, and Stacey Yanetta compete for the chance to advance to the Championship Round on April 21.

Wolter was the last employee standing and was crowned champion by the GRC 80th Anniversary planning team, which sponsored the event.

Special thanks to Robin Pertz, who served as the tournament host, with assistance from Ashley Cantor.

By Adam Schabel

PROMOTIONS

Dudek

Julianne Dudek has been selected chief, Inlets and Nozzles Branch, Propulsion Division for the Research and Engineering Directorate. She most recently served as the acting chief of the branch. Dudek previously worked as an aerospace engineer who focused on the development and application of computational fluid dynamics codes and methods.

Myers

Christie Myers has been selected chief, Environmental Management Office for the Facilities, Test and Manufacturing Directorate. She successfully served a 3-month supervisory detail as chief of the Environmental Management Office in 2020. Myers has 25 years of experience in environmental compliance and project management.

Shaw

Robert E. Shaw has been selected chief, Data and Systems Branch in the Testing Division for the Facilities, Test and Manufacturing Directorate. He most recently served as a technical lead in the branch. Shaw has 20 years of experience in project management and test facilities engineering.

RETIREMENTS

William Bennett, Photovoltaic and Electrochemical Systems Branch, Power Division, Research and Engineering Directorate, retired on May 31, 2021, with 10 years of NASA service.

Israel Greenfeld, Aeronautics and Ground-Based Systems Branch, Systems Engineering and Architecture Division, Research and Engineering Directorate, retired April 30, 2021, with 34 years of NASA service

MORE THAN A MEMORY

Greco

Frank J. Greco, 75, a 2012 retiree with 28 years of NASA service and a Navy veteran, died April 27. He retired as chief Safety and Mission Assurance Officer. Throughout Greco's career, he served as chief, Assurance Engineering Office, chief Safety Director, Technical Assurance manager, Safety and Mission Assurance chief engineer, and the Plum Brook Reactor Facility Decommissioning Program manager. He received several awards for his service, including an Exceptional Service Medal (2007).

Welcome, 2021 Summer Interns and Fellows!

This summer's NASA Internship Project; Minority University Research and Education Project Interns; Glenn High School Internship Project; National Space Grant Foundation; and Arkansas, Michigan, Minnesota, North Carolina, Washington, and West Virginia Space Grant Consortia interns come aboard on June 14 and work through Aug. 20. The NASA Glenn Faculty Fellowship Program and NASA (Graduate) Fellowships Program welcomed summer staff on June 7. Summer interns and fellows will work virtually this year.

Focus on Vision

Vision Health Presentation by the Cleveland Sight Center

Thursday, June 24, 11 a.m. to 12 p.m.

Topics include bad habits, blue light, and why nutrition has two eyes.

This event is coordinated by the Office of Diversity and Equal Opportunity.

Check Today@Glenn for more information.

POC: Angela Pierce, 3–2813

CORRECTION

In the *AeroSpace Frontiers* May issue, in the caption for the article, "Great Minds Though Time Think Alike," page 4, Roger Storm was incorrectly identified as "Benson."

INFORMATION CAFÉ

On Wednesday, June 16, from 11-11:45 a.m., the Library will host a mini lesson about the new O'Reilly learning platform." O'Reilly learning provides learners with expert-created and curated information covering all the areas that will shape our future—including artificial intelligence, operations, data, UX design, finance, leadership, and more. Check Today@Glenn for the Teams link.

POC: Robin Pertz, 3–5776

VIRTUAL FACILITY TOURS

Glenn is hosting a virtual public tour season, featuring seven world-class facilities, through October. To learn more about the featured facilities, visit https://www.nasa.gov/nasaglenntours. The next two tours include: June 22, Space Environments Complex at Neil A. Armstrong Test Facility; July 13, Simulated Lunar Operations Laboratory. Registration opens 1 month before the tour date. Space is limited. Tell your friends and family!

POC: Debbie Lockhart, 3–8655

VIRTUAL FITTNESS FUN

Join Glenn's Fitness Center staff and your co-workers for daily workouts via Microsoft Teams or exercise on your own with specially designed workouts. For information, visit https://www.grc.nasa.gov/smad/medical-fitness/#fitness.

POC: Bob Laws, 3–6313

OUTDOOR SIREN TESTING

Emergency Management Office staff will conduct an audible siren test on the "Area Evacuation" tone on Saturday, July 3, at Lewis Field. A mass notification voice test will be conducted at Building 3 on Wednesday, July 7.

POC: Allen Turner, 3–6826

Deadline for the next calendar section is **Wednesday, June 16, 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

Lewis Field
21000 Brookpark Road
Cleveland, Ohio 44135

Neil A. Armstrong Test Facility
3597 E. Scheid Road
Sandusky, Ohio 44870

www.nasa.gov

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

Celebrating 80 Years
Looking Back Through the Decades

MSFC-9141932 Photo by NASA

NASA's Voyager 1 spacecraft launched atop its Titan/Centaur-6 launch vehicle from the Kennedy Space Center Launch Complex in Florida on Sept. 5, 1977.

NASA Glenn was originally established in 1941 as the Aircraft Engine Research Laboratory (AERL), part of the National Advisory Committee for Aeronautics (NACA). The laboratory became a national resource for innovations in aircraft engine technology that transformed commercial and military propulsion systems.

Over the decades, NASA's Cleveland-based scientists and engineers advanced technology in both aviation and space exploration, propelling the U.S. into a leading role in the aerospace industry.

Quiet Engines and Loud Rockets: 1970s

Cutbacks to traditional aerospace programs spurred the center to explore new areas of research such as renewable energy and communication satellites. The aeropropulsion work concentrated on noise and emissions reductions. The center's most high-profile successes during the 1970s were the development of the Titan-Centaur and managing the launches of Viking and Voyager spacecraft.

Emergency and Inclement Weather Lines

Lewis Field: 216–433–9328 (WEAT)
Neil A. Armstrong Test Facility: 419–621–3333

Connect With Glenn