

AeroSpace FRONTIERS

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Faces Behind Glenn Technology Pages 4–5

**Dr. Pérez-Davis
Named Director
Page 3**

**Focus on
Conservation
Pages 6–7**

**Evolutionary Xenon
Thruster Fires
Page 12**





DIRECTOR'S SAFETY CORNER

A Pause for Remembrance

We embrace the new year with great progress in our human exploration activities at Glenn and across the agency. During this exciting time, we pause to remember the sacrifices and lessons learned from the Apollo 1 fire, Challenger's STS-51L mission and Columbia's STS-107 mission. Join me in remembering those fallen heroes as we continue to embrace a strong safety culture of engagement and openness with a willingness to speak up for safety and mission success.

Thank you for your continued commitment in safely accomplishing our missions.

AeroSpace Frontiers

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

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Building Solar Panels in Space

Creating an environment that allows us to have a long-term presence on another world is no easy task. But Glenn scientists are developing new technologies to make it possible, beginning with the solar cells that could power lunar habitats.

Engineers Lyndsey McMillon-Brown and Timothy Peshek led a study on perovskite solar cells, which could be an alternative to silicon solar cells generating power to sustain lunar habitats. Perovskite is an incredible conductor of electricity. It also can be transported into space as a liquid and then printed onto panels on the Moon or Mars, unlike silicon panels that have to be built on Earth and then shipped to space.

"It's a build as you go process," said McMillon-Brown, Photovoltaic and Electrochemical Systems Branch. "With just 1 liter of the solution, astronauts would have enough material to generate a megawatt of solar power, which is far more energy than is required to run the International Space Station."

The perovskite material is only part of what makes Glenn scientists so excited for the potential of this project; the other is the new method for assembling solar cells called electro spraying that researchers at the University of California at Merced developed.

To learn more about this research, visit the full story on Glenn's website at <https://go.nasa.gov/3362W3t>.

By Katherine Herrick



GRC-2019-C-09519

Photo by Bridget Caswell

Engineers McMillon-Brown, left, and Peshek measure a perovskite cell sample in the Spectrolab X-25 Solar Simulator in building 302 at Lewis Field.

Dr. Pérez-Davis Named Center Director

Senior Positions Announced

In a special all-hands meeting on Jan. 21, Associate Director Larry Sivic shared the news that Dr. Marla Pérez-Davis has been officially named Center Director of NASA Glenn. Pérez-Davis served as acting center director since Dr. Janet Kavandi's retirement on Sept. 30, 2019.

After thanking everyone for their support throughout her career, Pérez-Davis pledged her commitment to the center and the agency.

"My job is to build on the strong foundation established by Janet Kavandi, and to take Glenn Research Center to the next level," she said. "Thank you for allowing me to be your center director."

Due to the fact that 15% of Glenn's senior leadership retired over the past 2 months, Pérez-Davis noted that the center is actively working to fill these positions, including Deputy Center Director. She and Sivic provided updates on existing vacancies and introduced several of the new team members who addressed the audience.

After the personnel segment of the meeting, Pérez-Davis reviewed progress on some of the 2020 priorities announced during the December holiday gathering. The meeting concluded with a brief question-and-answer session.



GRC-2020-C-0324

Photo by Marvin Smith

Sivic and Dr. Pérez-Davis at the all-hands meeting.

The following positions were announced:

Office of the Director: Regional Affairs Specialist **Zacch Ashcraft**

Office of Chief Financial Officer: CFO **Vicki Hagerman** and Deputy **Gary Garbinski**

Office of Chief Counsel: Chief Counsel **Callista Puchmeyer** and Deputy **James Jackson**

Office of Human Resources: Director **Susan Whitfield** and Deputy **Larry Zoloty**

Office of Technology and Incubation: Deputy **Mary Lobo**

Office of Diversity and Equal Opportunity: Acting Director **Vincent Patterson**

Aeronautics: Director **Tim McCartney** and Deputy **Mary Wadel**

Space Flight Systems: Deputy **Kathy Schubert**

Safety and Mission Assurance: Acting Director **Gus Martzaklis**

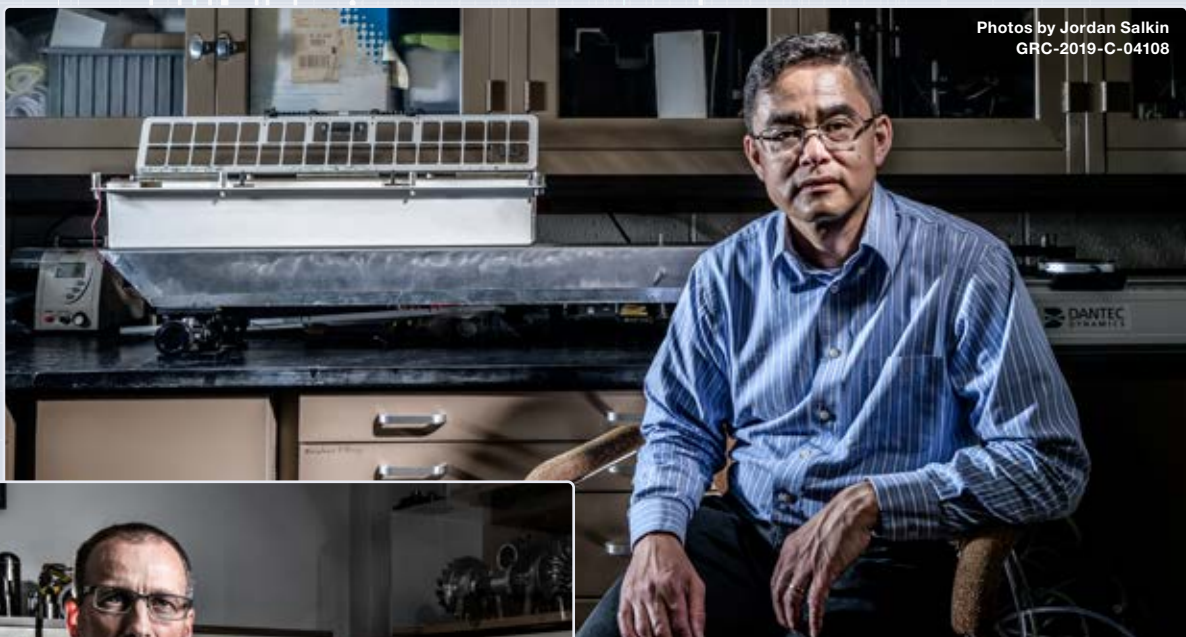
NASA Safety Center: Director **Harmony Myers** and Deputy **Karen Meinert**

The Faces Behind NASA Glenn's Technology

NASA Glenn is known for excellence in developing innovative technologies for both aeronautics and space exploration. But what about the people behind the technology?

Glenn's Digital Media Team recently published an Instagram portrait series in November profiling six of these inventors. Drawn from a variety of technical areas, Imaging Technology Center photographer Jordan Salkin worked with each researcher to craft a special portrait as well as photos of research hardware. Web Content Editor Nancy Kilkenny interviewed the researchers and wrote captions to highlight their work.

Log on to Glenn's Flickr site at <https://www.flickr.com/photos/nasaglenn/albums> to view all the photos and captions.



Above: Juan Agui, who developed a unique Multi-Stage Filtration System for the International Space Station that collects dust and other particles, is now improving the design for deeper space missions.



Left: Dr. Chris DellaCorte invented a ball bearing made of nitinol 60. Meant for use in gears and other mechanical components, these new alloys can withstand loads and stresses.



On the Cover: Engineer Tim Bencic invented a tomography system for Glenn's Propulsion System Laboratory to help understand the dangers of ice crystal icing on airplanes.

Right: Researcher Phil Neudeck and his team have developed extremely durable silicon carbide semiconductor integrated circuits to survive harsh environments like Venus.



GRC-2019-C-09958



GRC-2019-C-05622

Left: Dr. Maricela Lizcano, a materials scientist, worked with her team to invent a simple, low-cost microwave sintering process that can tailor the strength of the tows and heal damaged fibers.



GRC-2019-C-06247

Licensing your technology can open up many possibilities for you and your research.

For more information, visit
<https://technology.grc.nasa.gov>.

Above: Researcher Dr. Tiffany Williams takes carbon nanotube filaments, called yarn, and combines them with carbon fiber to make toughened braided textiles for aeronautics and space applications.

Center Earns High Recognition

Five Stars for Environmentally Friendly Fleet

NASA Glenn's fleet has been designated an Ohio Green Fleet by Clean Fuels Ohio's statewide Ohio Green Fleets program, which recognizes fleets for their efficiency and environmental performance. Fleets who earn this designation provide a community service by improving air quality and reducing dependence on imported petroleum.

The NASA Glenn fleet earned designation as a five-star Ohio Green Fleet. Evaluation of fleets are based on the implementation of policies which reduce vehicle emissions and petroleum fuels. A five-star certification is the highest achievement attainable and is reserved for those who have shown a significant commitment to fleet sustainability. To date, the program has enrolled more than 700 fleets, of which only 28 have been certified as a five-star Ohio Green Fleet.

Glenn's Vehicle Fleet Operations Officer Andrew Deenanauth, with assistance from Sandra Valenti, Center Operations Directorate, sorted and compiled years' worth of data on Glenn's



GRC-2019-C-11784

Photo by Marvin Smith

Left to right: Center Operations Deputy Seth Harbaugh, Center Operations Chief Robyn Gordan, Center Director Dr. Marla Pérez-Davis, Deenanauth, Valenti and Logistics and Technical Information Deputy Division Chief Gary Crawford.

fleet for award consideration. Last September, Deenanauth accepted the award on behalf of NASA Glenn at the 2019 Midwest Green Transportation Forum & Expo.

"Glenn has shown a strong commitment to sustainability by procuring alternative-fueled vehicles (E-85, electric and biodiesel)," Deenanauth said. "The Glenn fleet consists of 76% alternative-fueled vehicles, including nine all-electric vehicles. Since 2015, 74% of all the fuel used in vehicles is alternative fuel. Glenn is continuing to invest in electric charging stations to build our fleet of electric vehicles."

Glenn also has invested in multiple avenues of sustainable transportation around the center, including the bike program, airport courier services and the Lewis Field lab bus. A new GPS locator device for the lab bus encourages taking alternative transportation around Lewis Field.



GRC-2019-C-03023

Photo by Marvin Smith

Part of Glenn's electric fleet.

for Conservation Efforts

Award-Winning Energy and Water Management

NASA Glenn has received the 2019 Federal Energy and Water Management Award for the implementation of an Energy Savings Performance Contract (ESPC). The ESPC includes nine energy and water conservation measures at Lewis Field and Plum Brook Station.

This project (\$14.8 million investment value) spans diverse facilities separated by 50 miles and energy-conservation measures to improve heating, cooling, ventilation, lighting and potable water systems.

Conservation measures include:

- Improving chilled water systems
- Replacing over 21,500 light fixtures and installing over 1,100 lighting controls
- Replacing heating system in the Hangar and installing insulation blankets on steam fittings, valves and tanks
- Retrofitting or replacing toilets, urinals, sinks and showers with low-flow fixtures
- Replacing water-cooled air conditioners with chilled water fan coil units
- Installing variable frequency drives and sensors on HVAC fan motors

“The project is saving 61.8 billion Btu and 7.2 million gallons of water per year while reducing annual greenhouse gas emissions by 11,600 metric tons of carbon dioxide equivalent,” said Anthony Zupanchick, Glenn’s Energy and Water Conservation Program manager. “In the first year, the estimated energy, water and maintenance cost savings total \$1.2 million. Additional benefits include increased cooling system equipment redundancy, reduced lighting maintenance requirements and standardized plumbing fixtures.”

Glenn team members cited on the award include Vincent Verhoff, Quyen Quach, Frances Borato, Kevin Meredith and Anthony Zupanchick.



GRC-2020-CN-00001

Photo by Donica Payne

Left to right: Robert Ivester, director, Federal Energy Management Program; Alexander Fitzsimmons, chief of staff, Office of Energy Efficiency and Renewable Energy; Zupanchick; Kevin Meredith, Glenn project manager; Richard Marrs, NASA Office of Strategic Infrastructure; and Calvin Williams, NASA Office of Strategic Infrastructure.

Glenn Strikes Gold at Public Relations Society of America Awards

NASA Glenn's Office of Communications and External Relations was a double prizewinner at the 2019 Cleveland Rocks Awards. The contest is the PRSA Greater Cleveland chapter's signature event that recognizes the area's best in public relations and communications projects and programs. The team took Gold in the National Media Relations and Trade Media Relations categories for the Kilopower Nuclear Space Power Press Event.

In March 2018, NASA and the Department of Energy demonstrated Kilopower, a nuclear reactor power system that could enable long-duration crewed missions to the Moon, Mars and destinations beyond. Performed at the Nevada National Security Site, it was the first nuclear-powered operation of a new fission reactor concept in the United States in 40 years.

On May 2, 2018, NASA held a press conference at Glenn's Lewis Field, where Kilopower is managed. NASA's social media channels were also used to amplify coverage of the event.

The Kilopower press conference and press release resulted in over 200 original stories. National outlets covering the story included Newsweek, Forbes, Business Insider, Scientific American, Universe Today, World Nuclear News and many others.



GRC-2020-CN-00003

Photo by PRSA Cleveland

Left to right: Glenn's Media Relations News Chief Jan Wittry, Office of Communications & External Relations Deputy Frank Jennings and Chief Dovie Lacy receive the first of two Gold awards.

NEWS AND EVENTS

Event Empowers Native Americans

NASA Chief Information Officer Renee Wynn and Glenn's Dr. Joseph Connolly served on an interagency virtual panel of six accomplished Native Americans from various NASA centers in recognition of Native American Heritage Month. The event started a dialogue about challenges the Native community faces and strategies to achieve their goals. Panelists shared their experiences coping in highly competitive environments. They gave recommendations on how to create a healthy Native STEM community at NASA and insight on how to help NASA be more inclusive of the Native community. More than 130 participants tuned in to the interactive panel event.



ASM Recognizes Glenn Material Scientists and Engineers

The ASM International, formerly known as the American Society for Metals, recently presented their Engineering Materials Achievement Award to Glenn's NiTi Alloys for Bearings, Gears, Mechanical Components and Other Structural Applications Team. The award recognizes the achievements among leading members of the materials science and engineering community.

Back, left to right: Dr. Santo Padula, Dr. Samuel Howard, Dr. Othmane Benefan, Glen Bigelow; Front: Dr. Malcolm Stanford, Dr. Christopher DellaCorte, and Dr. Anita Garg. Not pictured: Fransua Thomas and Dr. Ronald Noebe.



GRC-2019-C-11753

Photo by Marvin Smith

Institution of Engineering and Technology (IET) Premium Award Announced

The paper "Large Electric Machines for Aircraft Electric Propulsion" earned a 2019 Premium Award from the IET. Glenn's Dr. Cheryl Bowman co-authored the paper, which was sponsored by NASA's Advanced Air Transport Technologies Project. IET awards recognize the best research papers published during the last 2 years.



Dr. Bowman



Dr. Paxson

AIAA Awards Best Paper

The AIAA's Pressure Gain Combustion Technical Committee has selected "Operational Stability Limits in Rotating Detonation Engine Numerical Simulations" (AIAA 2019-0748) as Best Paper from the 2019 SciTech Forum and Exposition. The paper, co-authored by Glenn's Dr. Daniel Paxson, Intelligent Control and Autonomy Branch, and Doug Schwer, Naval Research Laboratory, describes the development of, and mitigation strategies for, combustion instability observed in certain rotating detonation engine configurations.

Coming Soon: New Agency STI System

Glenn will start using the new agency solution, Scientific, Technical and Research Information discoVERY System (STRIVES), for all scientific and technical information (STI) reviews/approvals on March 16. STRIVES will replace the current Electronic Document Availability Authorization (EDAA)/NASA Form (NF) 1676.

IMPORTANT DATES:

March 16—Can only use STRIVES to submit STI for review and approval.

April 1—Approvers last day for approving forms in the EDAA/NF1676 system.

April 1—All corrected final documents must be received by the Glenn STI Office for final processing.

More information to come. Updates will be posted on the Glenn STI Program website:

<https://itidportal.grc.nasa.gov/STINews.aspx>.

RETIREMENTS



Blaser



Dedula



Hughes



Lopez



Redding



Salvo



Stauber

Thomas W. Balogas, Space Environments Test Branch, Testing Division, retired Jan. 3, 2020, with 40 years of service. (Not pictured.)

Carl M. Blaser, Materials and Structures Division, Research and Engineering Directorate, retired Jan. 31, 2020, with 36 years of service.

William (Tim) Dedula, Office of Education, Center Operations Directorate, retired Jan. 3, 2020, with 38 years of service.

William (Bill) Hughes, Structural Dynamics Branch, Materials and Structures Division, retired Dec. 31, 2019, with 33 years of service.

Isaac Lopez, Aeronautics Directorate, retired Jan. 3, 2020, with 37 ½ years of service.

Chip Redding, Mechanical Systems Design and Integration Branch, Materials and Structures Division, retired Jan. 3, 2020, with 38 years of service.

Mary Salvo, Office of Human Resources, retired Dec. 31, 2019, with 15 years of federal service.

Laurel Stauber, Innovation and Integration Office, Office of Technology Incubation and Innovation, retired Jan. 3, 2020, with 39 years of federal service, including 32 with NASA.

Retiring soon?

Share your retirement in AeroSpace Frontiers. Fill out the GRC431 form and send it to Doreen.B.Zudell@nasa.gov.

PROMOTIONS



Lawrence McLemore has been selected executive support assistant (ESA) to the Director of Center Operations, effective Dec. 8, 2019. McLemore previously provided administrative and clerical support to the Procurement Division, and more recently, as acting ESA on detail in the Center Operations Directorate.

McLemore

February Is Heart Month



Check out These Free Heart-Healthy Services

Medical Services Clinic, building 15, room 102

Civil servants: Physical exams; allergy shots; flu shots; work-related and personal injury/illness care; blood pressure checks; surveillance/certification exams; and work-related international travel immunizations and consultation.

Contractors: Flu shots; blood pressure checks; work-related injury/illness care; and emergency care in the event of dizziness, sudden chest pain or shortness of breath. Surveillance/certification exams, also available, if agreed upon by their company.

POC: Medical Services, 3-5841



Fitness Center, building 341

Civil servants, contractors, interns and retirees:

Group fitness classes Monday through Friday—mornings, lunchtime and evenings—yoga, Zumba, kickboxing, high-intensity interval training, muscle conditioning/total body toning, healthy back, rapid fit, circuit training and core and cardio.

Fitness assessments, personal training and weight loss/management programs

Recreational sports leagues—volleyball, basketball and flag football

POC: Fitness Center, 3-6313



GSEL MOBILE LIBRARIAN

The Glenn Science and Engineering Library (GSEL) Mobile Librarian will visit building 54 on Feb. 18 and 20; building 77 on Feb. 25 and 27 and March 3 and 5; building 86 on March 10 and 12. The hours are 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

NASA RETIRED WOMEN'S LUNCHEON

The next luncheon will be on Thursday, Feb. 20, at 1 p.m. at the 100th Bomb Group Restaurant, 20920 Brookpark Road. Please notify Gerry Ziemba at 330-273-4850 or gto64gerry@yahoo.com to reserve your place.

OUTDOOR SIREN TESTING

The Emergency Management Office staff will conduct a mass notification "voice" test at building 15 on Wednesday, March 4 at Lewis Field. An audible siren test will be conducted on the "all clear" tone on Saturday, March 7.

POC: Allen Turner, 3-6826

IFPTE LOCAL 28, LESA MEETING

LESA will hold its next membership meeting, Wednesday, March 11, noon, in the Glenn Employee Center's Small Dining Room.

Deadline for next calendar section is **Feb. 19, noon**. News and feature stories require additional time.



**National Aeronautics and
Space Administration**

John H. Glenn Research Center

Lewis Field

21000 Brookpark Road
Cleveland, Ohio 44135

Plum Brook Station

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>.



NASA's Evolutionary Xenon Thruster–Commercial (NEXT–C) fired for the first time recently inside the Electric Propulsion and Power Laboratory vacuum chamber 6 at NASA Glenn. The thruster is undergoing performance testing to verify it can withstand the extreme launch vibrations and hot and cold temperatures of spaceflight.

NEXT–C is a powerful next-generation solar electric propulsion system that could propel future long-duration science missions. The technology was developed at Glenn, and the flight hardware was designed and built by Aerojet Rocketdyne. Over the next few months, the Glenn and Aerojet Rocketdyne team will conduct vibration, thermal vacuum and performance tests on the flight hardware. The test campaign will conclude this winter when engineers mate the thruster with its power processing unit for an integration test.

NEXT–C is scheduled for in-space testing on the Double Asteroid Redirection Test (DART) mission in 2021. DART is a demonstration of technologies for preventing a hazardous asteroid from impacting Earth by changing the motion of the asteroid in space. The Johns Hopkins Applied Physics Laboratory leads DART for NASA with support from several NASA centers.

Emergency and Inclement Weather Lines

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

Connect With Glenn

