



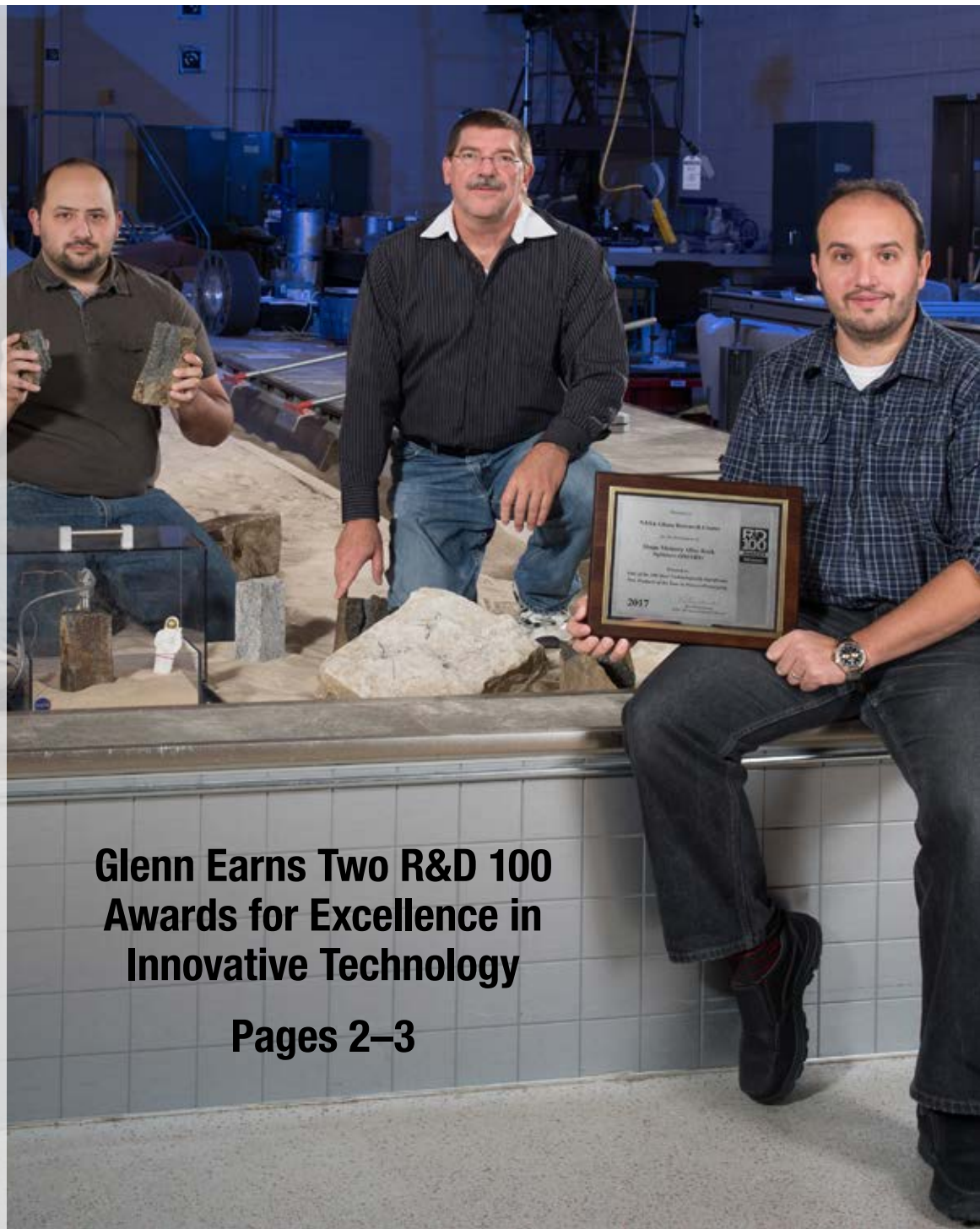
AeroSpace FRONTIERS

VOLUME 20 • ISSUE 1 • JANUARY 2018

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NASA Remembers

As we prepare for the next challenging step of human space exploration, we are reminded once again of the sacrifices of the Apollo 1, Challenger and Columbia crews. They were committed to an inspirational cause—explore space for the good of all. Human exploration is a risky venture. Our job is to provide a robust and reliable vehicle that will allow the crew to explore, return scientific knowledge and return safely to Earth. Please consider these hard-won lessons in the design, development and verification of our next vehicle to help assure mission success for the next phase of human exploration. Our emissaries to space are counting on us!

Looking forward to a continued commitment to safety practices in 2018.

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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Glenn Research Teams Win R&D 100 Awards!

Two teams of Glenn researchers were honored with R&D 100 Awards in November 2017, bringing the center's total number of this prestigious award to 123. The annual competition for excellence in innovative technology is sponsored by *R&D Magazine*.

The 2017 awards are for a pioneering shape memory alloy rock splitter to split apart rock formations without explosives or hydraulics and RTM370, a resin transfer molding for high-temperature applications.

Shape Memory Alloy Rock Splitters (SMARS)



On the cover: left, to right, Timothy Halsmer, Dr. Ronald Noebe and Dr. Othmane Benafan with SMARS in Glenn's Simulated Lunar Operations Lab.

SMARS is a device that generates large forces without any demolition damage to the surrounding environment. It is cost effective, reliable, and easy to set up and activate. Team SMARS inventors are Dr. Othmane Benafan and Dr. Ronald D. Noebe in Glenn's High Temperature and Smart Alloys Branch, and Timothy J. Halsmer, a Jacobs Technology employee supporting the Aerospace Test Branch.

"NASA Glenn's materials innovations are enabling disruptive new technologies with a broad range of applications," said Joyce Dever, deputy chief of Glenn's Materials and Structures Division. "SMARS is putting new alloys to work, providing groundbreaking force in a lightweight device."

SMARS can be used in oil drilling; hydraulic fracturing; mining—particularly gemstone and precious metal mining; offshore exploration; tensioning and lifting; civil engineering; paleontological projects, including fossil collection; archaeological digs; search-and-rescue operations; and the space industry.



GRC-2017-CN-00076
Photo by Technology Transfer Office

Dr. Chuang creates RTM370 in her lab.

Resin Transfer Molding (RTM) 370

RTM370 for high temperatures is a solvent-free process that simplifies high-temperature resin production and streamlines the fabrication of high-performing RTM370-based polymer composites. Dr. Chun-Hua “Kathy” Chuang, Materials Chemistry and Physics Branch, accepted the R&D 100 Award for RTM.

“RTM370 enables more complex and high-performing composite parts with less complex processing,” Dever said. “The benefits of RTM370 resin are significant weight and cost savings to the aerospace, electrical, oil drilling and specialty automotive industries.”

Potential RTM370 applications include injection molding of parts, such as trim, structural support, plastics and gears; high-temperature engine components, such as bushings and bearings; composite ducts and tubes; self-lubricating parts; and 3-D printing of high-temperature composite parts by laser sintering.

By Jeannette Owens

To learn more about NASA Glenn’s Technology Transfer Office, visit
<https://technology.grc.nasa.gov/>.

Choose Your Cause...Show Some Love



GRC-2017-C-09994

Photo by Rami Daud

Glenn's 2017 Combined Federal Campaign (CFC) Committee held its 2017 Charitable Agency Fair, Dec. 13, in the MIC Auditorium at Lewis Field.

Employees had opportunities to meet and talk with representatives from some of the charities that will benefit from this year's campaign. Light refreshments, appreciation gifts and prizes rounded out the event.

NEWS AND EVENTS

Glenn Teams With MAGNET on Manufacturing Day



Glenn's Office of Education and Manufacturing Facility personnel partnered with the Manufacturing Advocacy and Growth Network (MAGNET) to host the 2017 Manufacturing Day, Nov. 17, at Lewis Field. Facilities, Test and Manufacturing Director Tom Hartline welcomed 95 high school students from manufacturing-oriented career programs at Beaumont, Benedictine, St. Edward, Max Hayes and Parma Senior high schools.

The day included a career panel discussion, a comprehensive tour of the Manufacturing Facility including hands-on activities and demonstrations, and additional tour stops designed to increase the students' understanding of manufacturing-related careers and work performed at Glenn.

Photo by Bridget Caswell
GRC-2017-C-09745

Beaumont students examine a part produced in the Glenn Fabrication Shop.

Chief Technologist Touts Glenn's Impact to Ohio

Acting NASA Chief Technologist Dr. Douglas Terrier educated some and motivated others about NASA missions and Glenn's capabilities and impact on Ohio's economy during an official visit. As keynote speaker at Ohio Aerospace Day in Columbus on Nov. 28, Terrier spoke to over 150 industry officials, Ohio legislators and staff, and representatives of industry and university officials. He also joined Center Director Dr. Janet Kavandi on a panel focusing on "Ohio Aerospace, Our Present and Future." The next day, Terrier was hosted by Glenn's Office of Technology Incubation and Innovation. He toured several facilities and conducted a town hall to present "OCT101," an overview of NASA technology policy and programs and the strategic direction for the agency's space technology programs.

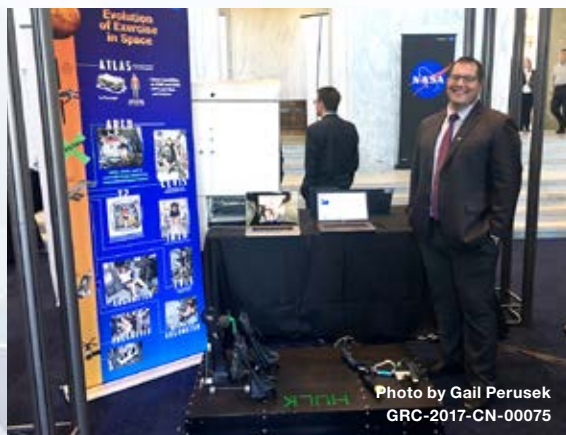


GRC-2017-C-00282

Photo by Bridget Caswell

Dr. Terrier fields questions during the town hall.

Glenn Supports ISS Demonstrations on the Hill

Photo by Gail Perusek
GRC-2017-CN-00075

Glenn's Justin Funk (ZINT), pictured, and Gail Perusek represented NASA's Human Research Program's support to the International Space Station (ISS) during ISS Day on the Hill in Washington, DC, Nov. 2. They staffed a display on the progression of exercise in space from Skylab to the ISS and future missions. The display also featured the Glenn-developed Hybrid Ultimate Lifting Kit exercise device, a ground prototype and precursor to the ISS Advanced Twin Lifting and Aerobic System (ATLAS).

Congressional members/staff and over 450 guests participated in hands-on demonstrations and discussions that answered questions centering on how ISS is being used to enable exploration.

Shadowing Day Encourages Internships, Careers



GRC-2017-C-09882

Photo by Bridget Caswell

Dave Stark, far right, describes features of the 8- by 6-Foot Supersonic Wind Tunnel to students during Glenn's High School Shadowing Program, Nov. 30. The Office of Education sponsored the program for juniors and seniors interested in science, technology, engineering, mathematics and professional administrative careers. During the event, current interns spoke about their responsibilities and the benefits of interning at NASA. A panel of subject matter experts discussed their positions, how they arrived at NASA, their educational backgrounds and careers in their work areas. Students then spent time with mentors in their areas of interest and toured two facilities.

Fun and Fellowship Abound at Holiday Gathering

Center Director Dr. Janet Kavandi and Glenn's senior leadership team hosted the 2017 Holiday Gathering for employees across the center, Dec. 7. Held in the MIC Auditorium at Lewis Field, the gathering offered entertainment, refreshments and time to extend holiday greetings to co-workers.



GRC-2017-C-09919

Members of the U.S. Marine Corps thanked employees for their generous donation to the Toys for Tots campaign.



GRC-2017-C-09928

Dr. Kavandi welcomes and thanks employees for a successful year.



GRC-2017-C-09904

Photos by Marvin Smith

Employees gather to exchange holiday cheer.

Emcee Dr. Betterson with talent winner George Scott Crawford.

GRC-2017-C-09957



Kavandi welcomed employees and thanked them for their hard work throughout the year. She later introduced a 2017 Center Accomplishments video that reinforced the center's outstanding contributions to NASA's mission.

Members of the U. S. Marine Corps picked up 12 boxes of employee-donated toys for their Toys for Tots campaign. Glenn's Combined Federal Campaign (CFC) Chairman Dale Hopkins gave an update on the 2017 CFC, and thanked employees for their generosity thus far.

A highlight of the event, Glenn's Holiday Stars Talent Show—enthusiastically emceed by Dr. John Betterson—spotlighted the talents of three employees. The audience joined in on the excitement by voting for their favorite contestant using the Conferences i/o Audience Response System. George Scott Crawford took the trophy for performing a country song that he wrote called "My Hometown." Fellow competitors included Morgan Miller playing "The First Noel" on the Theremin, and Rich Kurak reciting "The Chright Before Nistmas" using spoonerisms.

The Gingerbread Structure contest attracted a lot of attention as well. Betterson asked contestants to talk about creative processes and experiences building the edible structures. Samantha Brinkman's "Frosty Ever After" garnered the most votes. Creations by contestants Monica Guzik's "Christmas on the Moon" and Jennifer Maupin's "Would it Help if I Got Out and Pushed" spaceship made it a difficult choice.

The talented Lewis Ensemble provided a festive backdrop by playing a variety of holiday songs.

By Doreen B. Zudell



Lewis Little Folks Celebrate the Holidays

Music and merriment was in the air at the Lewis Little Folks Child Development Center, Dec. 8. In the morning, the Lewis Ensemble played a selection of holiday music for the children to enjoy and sing along. Later that day, the NASA Costumed Character Brigade continued the tradition that began back in the early 1960s with the yearly NASA Holiday Show, by visiting with the students.



GRC-2017-C-09937

Miller performs on the Theremin.



GRC-2017-C-09943

Kurak recites using spoonerisms.



GRC--2017-C-09966

Gingerbread structure contestants with Dr. Betterson, left to right: Guzik, Maupin and Meghan Ganss (accepting for winner Brinkman).



GRC-2017-CN-00072

The Costumed Character Brigade, minus Santa Claus.



GRC-2017-CN-00073

Children enjoy time with the characters.

*Gingerbread structure winner:
"Frosty Ever After"*

GRC-2017-C-09898



GRC-2017-CN-00074

Photo by Doreen B. Zudell

The Lewis Ensemble plays a selection of holiday songs.



Glenn Celebrates the Creativity of Its Inventors

A group of inventors that filed a new technology report in FY16.

GRC-2017-C-08782 Photo by Marvin Smith

The Technology Transfer Office (TTO) honored its inventors and other fiscal year 2016 (FY16) award recipients, Nov. 8, during its Third Annual Glenn Inventor Recognition Ceremony. Twenty-five inventors were recognized for their patent applications, 34 inventors for their patents issued, 18 inventors for their software releases, and numerous inventors for submitting new technology reports.

Deputy Director Dr. Marla Pérez-Davis and Director of Technology Incubation and Innovation Dr. John Sankovic welcomed attendees. Chief of the Technology Transfer Office Harvey Schabes shared FY16 organizational highlights.

Keynote speaker, Dr. Félix Miranda, Glenn's Communications and Intelligent Systems Division deputy chief and award-winning technologist, shared tips from George Heilmeier's "Critical Questions for Research Proposals" to answer the objectives of your invention—Is your approach new? How will it make a difference?

Miranda stressed the value of working closely with the TTO staff. He said they provide excellent support to inventors—from reviewing a technology report and assisting in the patent process, to developing awareness and generating resources to facilitate the application of their technologies.

Dr. Stephen Steiner, president and founder of Aerogel Technologies LLC, served as guest speaker. His company has licensed a suite of aerogel technologies from Glenn patents. He gave an overview of aerogel technologies and their applications and provided a business perspective on the win-win relationship he has with the TTO staff and Glenn inventors.

For a complete list of the awardees, visit <https://events.grc.nasa.gov/inventors/>.

By NASA Glenn Technology Transfer Office



Dr. Weiland

Weiland Earns NESC Award

The NASA Engineering and Safety Center (NESC) presented their 2017 Leadership Award to Dr. Karen Weiland, Science and Space Technology Systems Branch, Nov. 14, during a ceremony at NASA's Langley Research Center. She was recognized for exceptional leadership in the planning and implementation of the NASA Model-Based Systems Engineering Pathfinder.

Crain's Honors Two Glenn Employees

Crain's Cleveland Business magazine recently recognized two Glenn employees.

Chief Financial Officer **Larry Sivic** was named one of Crain's 2017 Northeast Ohio top C-Suite executives for his contributions, community commitments and outstanding professional performance.

Science and Space Technology Systems Branch Chief **Dr. Lynn Capadona** was named one of Crain's 2017 Class of Forty Under 40 rising stars. She is recognized for her technical achievement, leadership and ability to positively impact the region throughout her career.



GRC-2017-CN-00069

Sivic, center, with his wife Ingrid, left, and Glenn Associate Director Janet Watkins during the C-Suite Gala.



GRC-2017-CN-00070

Photo by Every Angle Photography

Dr. Capadona, center, is presented her award by, left to right, Julie DiBiasio with Weatherhead School of Management and Elizabeth McIntyre, publisher and editor of Crain's Cleveland Business.

Multimedia Feature Highlights Superelastic Spring Tire for Mars

Engineers at NASA Glenn and the Goodyear Tire & Rubber Company have developed a revolutionary new tire that has been gaining a lot of attention across the nation.

The Superelastic Spring Tire, which consists of hundreds of nickel titanium (NiTi) springs woven into a flexible mesh, is the product of two of Glenn's areas of expertise—tire development and shape memory alloy research—coming together. The most recent iteration of this tire was designed with future Martian roving vehicle missions in mind, though the technology has applications on the moon and Earth as well.

Because of the superelastic characteristics of the shape memory alloy NiTi, as well as the unique tire structure, the tire is capable of supporting high loads and undergoing severe levels of deformation without damage. This allows for greatly improved traction and durability compared to the current state of Martian wheel technology.

Glenn's Digital Communications Team, in conjunction with the Imaging Technology Center, has produced an online multimedia piece that highlights the development of this tire. Check it out at <https://www.nasa.gov/specials/wheels/>.

Photo by Rami Daud
GRC-2017-C-08431



Thank You, READERS!

A special thank you to those of you who took the time to complete the online *AeroSpace Frontiers* customer survey! The editorial team will be working to incorporate your suggestions into the newsletter over the coming months.

PROMOTIONS



Gati

Frank Gati has been promoted from deputy chief to chief of the Exploration Systems Project Office. He oversees Glenn tasks supporting human launch and crewed systems. This includes the Space Launch System and Multi-Purpose Crew Vehicle Programs, Advanced Exploration Systems technology development and Commercial Crew activities.



Mullins

James Mullins has been selected Facility Manager for the Chemical Propulsion Research Complex, Creek Road Cryogenic Complex, Fuel Cell Testing Facility and the Glenn Extreme Environments Rig in the Test Facility Management Branch. He previously provided mechanical test engineering support across multiple facilities in Glenn's Test Division.

MORE THAN A MEMORY



Ratvasky

William "Bill" M. Ratvasky, 86, a 1994 retiree with 42 years of NACA/NASA service, died Nov. 20. Ratvasky was an instrument technician who served predominately in the Test Installation Division. He was a member of the Optical Measurement Section supporting research and development goals in Schlieren systems, solar simulation, laser and fiber optic technology, holography and more. He also won several Innovative/Suggestion awards, including one for a special high-temperature insulation for anodes used in the solar simulator in the Space Power Facility. His son, Tom Ratvasky, is a member of Glenn's Icing Branch.

RETIREMENTS



Goin Sr.



Griffin



Kwasny



Miller

Milo D. Dahl, Acoustics Branch, Propulsion Division, retired Dec. 31, 2017, with 34 years of service.

Michael Ernst, Aircraft Operations Office, Facilities, Test & Manufacturing Directorate, retired Jan. 3, 2018, with 34 years of service.

Debra M. Findley, Aeronautics Mission Office, Aeronautics Directorate, retired Jan. 3, 2018, with 38 years of service.

Michael W. Goin Sr., Cleveland Federal Executive Board, retired Dec. 31, 2017, with 34 years of service.

Thomas A. Griffin, Wind Tunnel Test Branch, Testing Division, retired Dec. 25, 2017, with 34 years of federal service, including 8 with NASA.

Michael J. Kinkelaar, Research and Space Operations Branch, Procurement Division, retired Jan. 3, 2018, with 36 years of service.

Randall R. Kwasny, Maintenance Management Branch, Facilities Infrastructure Division, retired Jan. 3, 2018, with 40 ½ years of service.

Richard C. Miller, Occupational Health Branch, Safety and Health Division, retired Dec. 31, 2017, with 35 years of service.

Joyce S. Wanhainen, European Service Module Integration Office, Space Flight Systems Directorate, retired Dec. 29, 2017, with 34 ½ years of service.

Upcoming Center Events

NASA Day of Remembrance

Thursday, Jan. 25

This observance reflects on the sacrifice of those who lost their lives supporting NASA's mission of exploration.

Stay tuned to *Today@Glenn* for details.



NASA Glenn Employees: For more calendar information, visit <https://wing.grc.nasa.gov/event-calendar/>.



FEBRUARY OUTDOOR SIREN TESTING

The Emergency Management Office staff will conduct an audible siren test on the "severe thunderstorm" tone on Saturday, Feb. 3, at Lewis Field. A mass notification "voice" test will be conducted at building 6 on Wednesday, Feb. 7.

POC: Allen Turner, 3-6826

IFPTE LOCAL 28, LESA MEETING

LESA will hold its next membership meeting, Wednesday, Feb. 14, noon, in the Glenn Employee Center's Small Dining Room.

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

Outreach Team Engages Thousands in 2017

Glenn's Community Relations Team brought NASA's mission to more than 700,000 people at festivals, air shows, conferences and events in 2017! The team packed up NASA artifacts and exhibits and traveled near and far to support over 50 outreach events last year.



Photo by Quentin Schwinn
GRC-2017-C-05561

Glenn staff accommodate crowds at the total eclipse event at Edgewater Park, Cleveland.

Continued on Back Page

**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>



GRC-2017-C-05255

Photo by Rami Daud

Glenn staffed the JTT Trailer at the National Scout Jamboree.



GRC-2017-C-00335

Photo by Bridget Caswell

Students admire exhibits at the Hidden Figures event at Tri-C in Cleveland.

Outreach Team Engages Thousands in 2017 (continued)

Here are just a few examples of high-impact events the team covered with the help of employees across the center:

- **Solar eclipse activities:** Jefferson City, Missouri, and three local events (total attendance over 45K)
- **Duluth Airshow:** Minnesota (total attendance over 30K)
- **Hidden Figures events in the local area:** (total attendance from five events over 3K)
- **Armstrong Space Symposium and Chair Installation:** Ohio State University, Columbus, Ohio (total attendance over 400 including 250 high-level industry and government leaders from across the world)
- **AirVenture:** Oshkosh, Wisconsin (over 30K reached at NASA pavilion—total event attendance over 560K)
- **National Scout Jamboree:** Mount Hope, West Virginia (Journey To Tomorrow (JTT) traveling exhibit appearance—total event attendance over 30K)
- **National Girl Scout Convention:** Columbus, Ohio (total attendance over 10K)
- **Cleveland Mini Maker Faire:** Cleveland, Ohio (JTT first appearance at this event—total attendance over 2K)

The team is looking for employees to help share the NASA story in 2018.

To learn more about future staffing opportunities, visit <http://outreach.grc.nasa.gov>, or contact David DeFelice at 3-6186.

Emergency and Inclement Weather Lines

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

Connect With Glenn

