

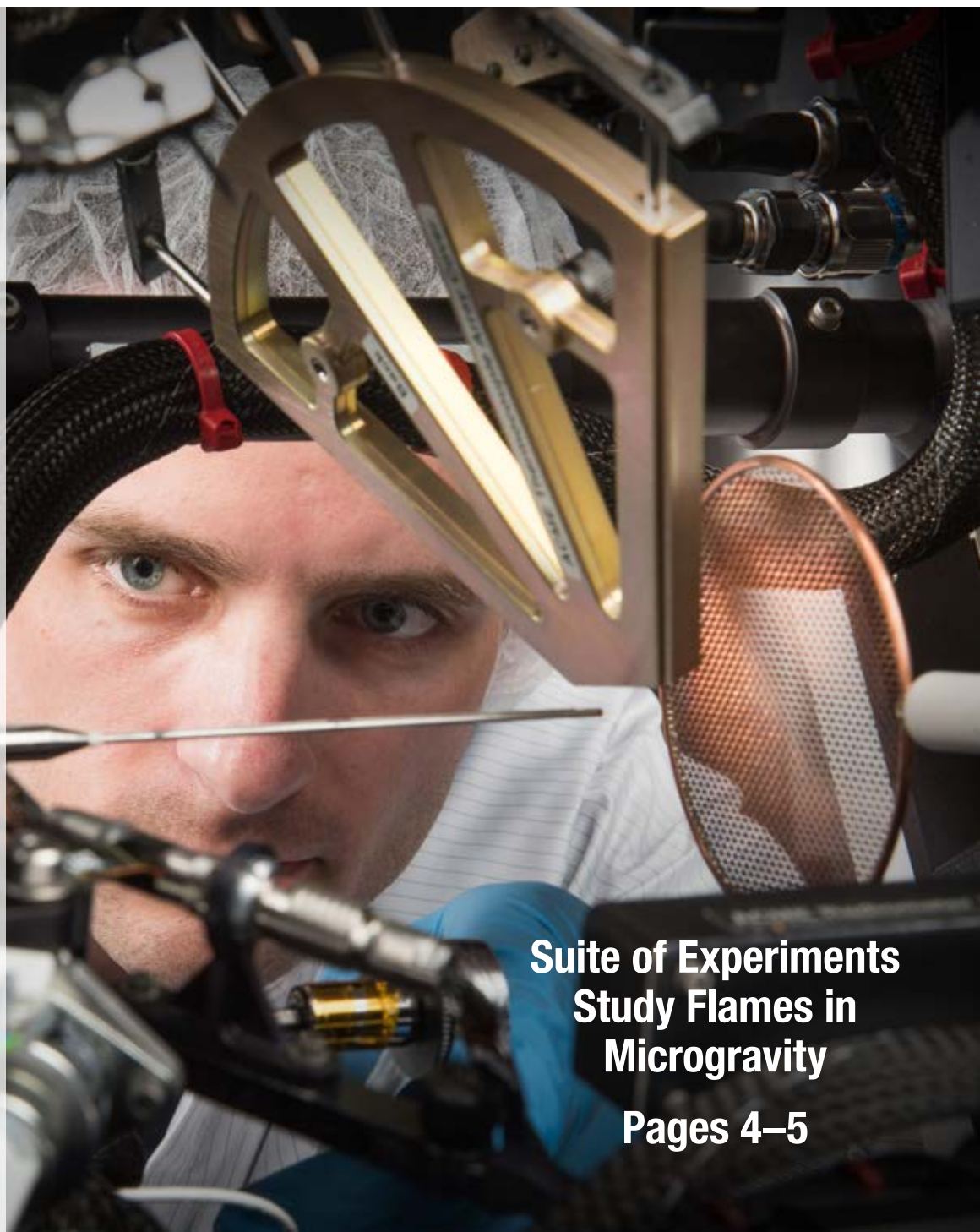


National Aeronautics and  
Space Administration



# AeroSpace FRONTIERS

VOLUME 19 • ISSUE 6 • JUNE 2017



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## DIRECTOR'S SAFETY CORNER

### Continuing Our Commitment to Safety

Safety and Health Awareness Day takes place on Tuesday, June 13, and I am pleased to welcome former Shuttle Program Manager, Wayne Hale, and safety expert, John Martin, as our guest speakers. This year's theme, Safe and Sound, echoes the Occupational Safety and Health Administration's campaign, and it is an important reminder that we must make sound decisions when it comes to our safety. Please join me for the discussions, activities and interesting presentations. I hope to see you there.

Let us continue our journey to safety, health and mission excellence.

### *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](mailto:doreen.b.zudell@nasa.gov).

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GRC-2017-CN-00026

Photo by NASA

## From 2-D to 3-D, Space Station Microscope Gets an Upgrade

Microscopes allow us to look at particles that would otherwise be invisible to the naked eye, but these particles are usually masked by gravity. The same force that keeps your feet firmly planted to the ground also interferes with getting a good look at how things move and interact at the microscopic level.

The Light Microscopy Module (LMM) microscope aboard the International Space Station gives researchers a look at what is happening fundamentally without the interference of gravity. LMM is a remotely controllable, automated microscope that operates in the Fluids Integrated Rack and is managed by NASA Glenn.

Presently, the microscope provides detailed 2-D images that aid the advancement of science. However, the images it provides can be a bit fuzzy and hard to examine.

Engineers at NASA Glenn recently sent an LMM upgrade consisting of a new laser, scanner and 8-bit digital camera aboard the SpaceX CRS-11 International Space Station resupply mission. In July, space station astronauts are slated to install the new hardware. This upgrade will significantly improve the microscope's resolution and contrast by eliminating unnecessary light.

"We'll have a 3-D capability that will expand our ability to see what is going on at a fundamental level," said Ron Sicker, project manager, ISS and Human Health Branch.

By providing sharper images that can be studied from every angle, the LMM will aid researchers in gaining a better understanding about the microscopic world. That knowledge will help us on Earth and in space.

"This could open a whole new world of science," said Sicker.

### ***Pictured Above:***

*Astronaut Dan Burbank, Expedition 30 commander, conducts a session with the Preliminary Advanced Colloids Experiment at the LMM on the International Space Station.*



# Welcome to the Newly Designed *AeroSpace Frontiers*!

We think you'll find the enhanced *AeroSpace Frontiers* layout helps tell NASA Glenn's story in a visually pleasing manner.

We've also made changes to how the issue is distributed. Issues are now delivered in bulk mailing to internal mail stops (without personalization) and hard copies of the newsletter are no longer being mailed to external readers.

In addition, new publication stands are located at Lewis Field and Plum Brook Station main gates, as well as the fitness center and the Edward R. Sharp Employee Center. Pick up a copy for yourself or share it with a friend.



*Publication stands containing newsletters are located in several high-traffic areas within Lewis Field and at the Plum Brook Station Main Gate.*

Photo by Doreen Zudell  
GRC-2017-CN-00027

## National Lab Day Promotes STEM Careers



GRC-2017-CN-00036

Photo by Doreen Zudell

Last month, NASA Glenn held its 2017 National Lab Day activities at Lewis Field and Plum Brook Station. On May 12, the Office of Education hosted approximately 200 middle school students to Lewis Field. Students participated in facility tours, an engineering design challenge and research demonstrations. Astronaut Jeff Williams kicked off the event. On May 17, Plum Brook Station welcomed nearly 100 middle school students for a day of hands-on activities and facility tours. Employees from across both campuses staffed these events to help inspire our next generation of scientists and engineers.



GRC-2017-C-02660

Photo by Rami Daud



GRC-2016-C-05055

Photo by Marvin Smith

*ACME Systems Engineer Chris Mrocza (ZIN), left, and CIR engineer Jim Birchenough perform a ground check of the ACME chamber insert, which fits into the space station's Combustion Integrated Rack.*

# Suite of Experiments Study Flame Behavior in Microgravity

Researchers from across the country have developed a series of experiments to expand our understanding of flames at a fundamental level. Working with NASA Glenn to conduct research on the International Space Station (ISS), the investigators will study flames burning in microgravity under a range of conditions. Results of the experiments could lead to improved fuel efficiency and pollutant reduction.

Glenn's Advanced Combustion Microgravity Experiment (ACME) project hardware—comprised of five independent flame experiments designed to test different aspects of flames—recently launched on SpaceX's 11th space station resupply mission. ACME tests will be conducted in the space station's Combustion Integrated Rack, and the experiments will be operated remotely from Glenn's ISS Payload Operations Center.

"Four of ACME's experiments are designed to improve our understanding of flame behavior for practical use on Earth," said ACME Project Scientist Dennis Stocker, Combustion Physics and Reacting Process Branch. "The other experiment is intended to help us understand and improve spacecraft fire safety."

## The experiments include

- Coflow Laminar Diffusion Flame (CLD Flame)
- Electric-Field Effects on Laminar Diffusion Flames (E-FIELD Flames)
- Structure and Response of Spherical Flames (s-Flame)
- Flame Design
- Burning Rate Emulator (BRE)

For more information on the ACME experiments, visit <https://go.nasa.gov/2rEeHyY>.





*Microgravity conditions allow the creation of spherical flames that simplify analysis and reveal behavior which is difficult to study on Earth. Flames like this one are yielding valuable information about soot formation and flame extinction.*

Photo by Peter Sunderland  
GRC-2017-CN-00025



### ***On the Cover:***

*Chris Mroczka (ZIN) takes an up close look at the ACME hardware that will be inserted into the combustion chamber. Mroczka is examining a simple burner (a narrow tube from which the gaseous fuel flows) and the disk-shaped copper mesh, which is used to generate an electric field.*

GRC-2017-C-05051

Photo by Marvin Smith



## Space Apps Challenge Encourages Creative Solutions

Participants check out an augmented reality fluid flow display while touring the Graphics & Visualization (GVIS) Lab during the annual International Space Apps Challenge hosted at Lewis Field, April 28. This international event brings together coders, scientists, designers, storytellers, makers, builders, technologists and space enthusiasts in cities around the world to address NASA challenges. Participants used NASA's Earth Science data to develop mobile applications, software, hardware, data visualizations and platform solutions that could help improve life on Earth.

Photo by Gary Nolan  
GRC-2017-CN-00028

# NEWS AND EVENTS

## Unite Our Voices By Speaking Together

During Glenn's Asian American and Pacific Islander Heritage Program, May 9, Dr. Param Srikantia, pictured, introduced the concept of the "chattering monkey" in our brain that affects our self-esteem and creates barriers to working in multicultural environments. Respected professor, speaker and author, Srikantia used animated humor to encourage audience members to rise above negative man-made realities that impede our ability to unite our voices toward common goals. This program was sponsored by the Office of Diversity and Equal Opportunity and Glenn's Asian American/Pacific Islander Advisory Group.



Photo by Rami Daud  
GRC-2017-C-02464

## Did You Know... Glenn Rocks SBIR/STTR Contracts



GRC-2017-CN-00024

Photo by NASA

NASA Glenn has consistently been one of the agency's leaders in awarding Small Business Innovative Research and Small Business Technology Transfer (SBIR/STTR) contracts. For FY17, Glenn received the most proposals of all NASA centers—almost 20% of the agency's total!

More than 540 scientists, engineers and managers are involved in reviewing, evaluating and ranking 376 proposals. Here's what we have done in SBIR contracts thus far in FY17:

- Awarded 8 Phase 3 contracts
- Awarded 22 Phase 2 contracts (16% of agency's 133 awards)
- Awarded 53 Phase 1 SBIR contracts and 5 STTR contracts (15% of agency's 399 awards)
- Phase 2 STTR awards from PY16 will be reviewed and awarded later this year

For more information on NASA SBIR/STTR, visit <https://sbir.nasa.gov>.



## Expedition Astronaut Shares Post-Flight Mission Highlights

Astronaut Jeff Williams, who served as Expedition 47 flight engineer and Expedition 48 commander, conducted a post-flight mission briefing for Glenn employees at Lewis Field, May 11. Williams, pictured, talked about his career and spaceflight experiences. In addition to spending a record-breaking 534 days in space, Williams was instrumental in preparing the space station for the future arrival of the U.S. commercial crew spacecraft. He shared some history of the evolution of the space station and the importance of working with international partners. After the briefing, Williams participated in an informal meet and greet session.



GRC-2017-C-02489

Photo by Rami Daud

## Dr. Kavandi Addresses Women in STEM at City Club

Center Director Dr. Janet Kavandi and Cleveland Museum of Natural History's Director and CEO Dr. Evalyn Gates, addressed the topic, *Bridging the Divide: Women, Innovation and STEM*, during a forum at the City Club of Cleveland, April 21. They discussed the impacts of increasing women in STEM (Science, Technology, Engineering and Mathematics) and the structural social barriers that still face women.



GRC-2017-CN-00034

Photo courtesy of Michaelangelo's Photography

## OSU Honors Astronaut Neil Armstrong With Chair Installation

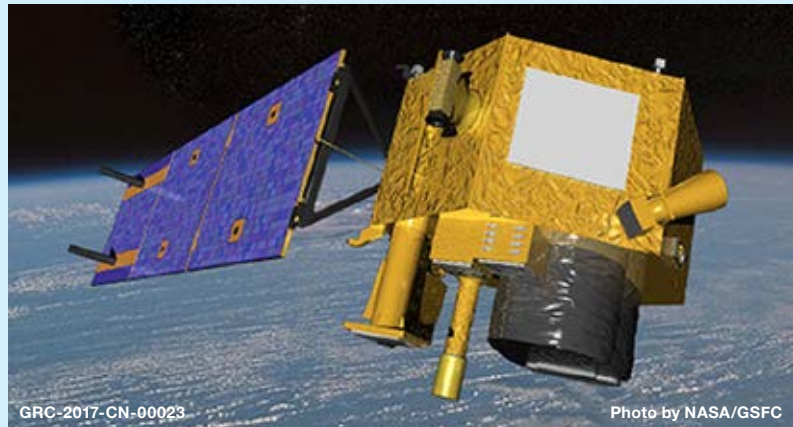


GRC-2017-C-02727

Photo by Rami Daud

The Ohio State University honored the legacy of the late Neil Armstrong, Apollo 11 commander and first man on the moon, during the Space Symposium and Chair Installation for The Neil Armstrong Chair in Aerospace Policy in the John Glenn College of Public Affairs and the College of Engineering, May 8. Center Director Dr. Janet Kavandi; Marshall Space Flight Center Director Todd May; Mike Griffin, former NASA administrator, and several Apollo era astronauts and program managers spoke at the event to honor Dr. John Horack as the first Chair. Glenn's Outreach staff provided the exhibits. The event was open to the public. Pictured, left to right: May, Apollo 17 astronaut Harrison Schmitt, Dean of The Ohio State University College of Engineering David Williams, and Kavandi.

# Glenn Celebrates Contributions to Mission Successes



*An illustration of the EO-1 satellite in orbit.*

After 17 years in orbit, the experimental Earth Observing Satellite (EO-1) mission came to an end on March 30. On Sept. 15, the Cassini-Huygens spacecraft will complete the final phase of its mission to explore Saturn and its complex system of rings and moons.

Glenn and Primex Aerospace developed, designed and qualified a pulsed plasma thruster (PPT) for use with a technology flight experiment on the EO-1 mission. The PPT combined new technology with heritage designs from the 1970s and 1980s. During the 3-day experiment, the low-mass PPT enabled the satellite to conduct precise pitch control maneuvers and managed its momentum during the solar array's operation. The overall EO-1 mission focused on performing Landsat-like measurements with new remote sensing technologies and instruments. EO-1 is expected to return to Earth, after disintegrating into bits, by 2056.

A Glenn team monitored Cassini's flight from liftoff on Oct. 15, 1997, through separation from the Centaur stage. The center's Communications Technology Division developed Cassini's 32-GHz traveling wave tube with its power supply (amplifier), called a TWTA, and provided flight hardware for the mission. This device increased the accuracy of the distance measurements for the radio science and gravitational wave experiments conducted while Cassini orbited Saturn and transmitted vital data to scientists worldwide.

By S. Jenise Veris

## Glenn Teams Nominated for 2017 RNASA Stellar Awards



*Dr. Carol Ginty (E-STa) and Dr. Gary Ruff (Saffire) attended the event as representatives for their teams.*

Glenn's European Service Module Structural Test Article (E-STa) Campaign Team and a joint corporate/government team of Glenn's Saffire Team and Orbital ATK's Cygnus Saffire Integration and Operations Team, were among the finalists that recently competed at the Rotary National Award for Space Achievement (RNASA) Foundation's 2017 Stellar Awards.

E-STa was nominated for enabling human spaceflight beyond the moon through international collaboration on structural and acoustic testing of a new service module. The Saffire/Cygnus team was nominated for development and successful demonstration of an advanced spacecraft fire safety experiment (Saffire) flown as a Cygnus hosted payload.

The RNASA Foundation coordinates the annual event to recognize outstanding individual and team achievements in space and create greater public awareness of the benefits of space exploration.



*An illustration of Cassini above Saturn's northern hemisphere.*

Photo by NASA/JPL-Caltech  
GRC-2017-CN-00021



# FEB Awards Recognize Outstanding Service to Job and Community

Seven NASA Glenn employees received the Federal Executive Board (FEB) “Wings of Excellence” Award, May 5, during the 2017 Recognition and Awards Program. The award honors 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. The following Glenn employees were honored:



*Glenn's Associate Director for Strategy Therese Griebel, far right, joins the Glenn honorees, left to right: Held, Kabak, Jicha, Sledge, Koch, Tarver and Brown.*

GRC-2017-CN-00035

Photo by Barb Breen, Veterans Administration Medical Center

**Carl A. Brown**, for distinguished service as a safety and occupational health specialist assuring fire and life safety measures are installed on the job and at numerous public events; and for volunteerism and community service with Glenn's Disability Awareness Advisory Group and African Heritage Advisory Group, the Cleveland Food Bank and the Ohio High School Athletic Association.

**Brian A. Held**, for his knowledge as NASA Glenn's Facility Operations Specialist for High Voltage and innovative approach to overseeing the maintenance of Glenn's institutional and ground test facilities to ensure they are operational for NASA missions; and for achieving the distinction of an Eagle Scout and becoming an active member of the Fraternal Order of Eagles, Lodge 3505 in Brunswick, Ohio.

**Tina L. Jicha**, for vision and leadership as the business manager for the European Service Module Integration Office while collaboratively executing international partnerships with diverse personnel in the United States and Europe for this deep space endeavor; and for inspiring community support through fundraising efforts for cancer research.

**Helen Kabak**, for service with distinction as executive support assistant to the director of Glenn's Center Operations Directorate and for providing mentoring, advice, guidance and quality control among the administrative staff to ensure the organization's success

in meeting its commitments daily. Kabak's ability to communicate effectively with a wide array of customers has made her a trusted point of contact.

**L. Danielle Koch**, for developing patent-pending bio-inspired acoustic absorbers now being developed for a wide range of aviation and industrial noise control applications; for serving as a FEB tutor and collecting donations for needy students at Clark School; and for supporting Glenn's Shadowing Program. Koch also promotes improved public speaking as an officer in Glenn's Aerospace Toastmasters Club.

**Ra-Deon L. Sledge**, for leadership of a matrixed team of information technology professionals and analysts assembled to overhaul Glenn's IT financial management practices to align with new federal law and regulations. Sledge also serves the community through her leadership as vice-chair of Glenn's African Heritage Advisory Group, mentoring Lean Six Sigma candidates and lending her exceptional vocals towards improving workforce morale.

**Marcus Tarver**, for service as a budget analyst in Glenn's Resource Analysis Division, providing outstanding support to NASA's Science Mission Directorate projects by building better relationships. Tarver also supports multiple Glenn outreach events as chair for the African Heritage Advisory Group planning Black History Month programming, mentoring and creating shadowing opportunities that pair group members with local high school students.

By S. Jenise Veris

# Fisher Receives Prestigious Flight Safety Award

Jim Free, NASA's deputy associate administrator for Technical Programs, Human Exploration and Operations Mission Directorate, presented the Space Flight Awareness Flight Safety Award to Caleb Fisher, Fluid and Cryogenics Systems Branch. Former Center Director Free returned to Glenn on April 24 to recognize Fisher for his efforts in exposing a critical safety hazard and coordinating a multicenter mitigation response for the return segment of the Orion Exploration Flight Test-1 mission.



GRC-2017-C-01826

Photo by Marvin Smith

*Deputy Director Dr. Marla Perez-Davis, far right, and Fisher's supervisor, Robert Buehrle, far left, join Free in presenting the award to Fisher.*

## RETIREMENTS



*Dr. Ginty*



*Morris*



*Puzak*

**Dr. Carol Ginty**, European Service Module Integration Office, Space Flight Systems Directorate, retired May 3, 2017, with 35 years of service.

**Joseph E. Morris**, Program Management and Planning Office chief, Facilities Division, retired May 31, 2017, with 27 ½ years of service.

**Robert M. Puzak**, Systems and Operations Management Branch chief, Facilities Division, retired May 31, 2017, with 33 ½ years of service.

## IN APPRECIATION

Many thanks for your expressions of love and generosity for my retirement. I truly appreciate my NASA family and will be in awe of NASA forever.

— Avis Hudson-Burnette

## Attention Retirees!

To electronically subscribe to *AeroSpace Frontiers*, email  
[grc-aerospacefrontiers-subscribe@lists.nasa.gov](mailto:grc-aerospacefrontiers-subscribe@lists.nasa.gov)

## MORE THAN A MEMORY

**Edward W. Otto**, 95, a 1977 retiree with 33 years of NACA/NASA service, died April 21. Otto began his career while also serving in the Air Force Reserves, conducting research on control systems for piston, jet and rocket engines. Later, as the Flight Experiments Section head, Nuclear Systems Division, his control experience was used to help design the gimbal rig and Zero-G facility.

**G. Paul Richter**, 84, a 1997 retiree with 42 years of NACA/NASA service, died March 28. Richter retired from the Turbomachinery and Propulsion Systems Division after a long career supporting research for the development of slush hydrogen (SLH2) as a propellant. His expertise in the design of unique fluid flow systems earned him numerous awards for individual and team contributions to propellant integration and analytical modeling supporting the National Aero-Space Plane Program and Variable Cycle Engine Project.

**Victor G. Weizer Jr.**, 83, a 1997 retiree with 41 years of NASA service, died March 4. Weizer retired from the Power and Onboard Propulsion Technology Division, where he conducted research and developed technology for alternate and cost-cutting ways to improve/increase output of solar cells and arrays. He was recognized as a leader in the field and authored numerous papers on the subject. Weizer also mentored for the NASA/East Tech Partners in Education Program.



*Richter*



*Weizer Jr.*



# Upcoming Center Events



## 2017 Center Picnic

**Wednesday, July 19**  
11 a.m. to 2 p.m.

Food, music and fun activities with your co-workers!  
Watch Today@Glenn for details.

**Retirees Welcome!**

Reservations: Harmony Myers, 216-433-9613

## Take Our Daughters and Sons to Work Day

**Wednesday, July 26**



Children, grandchildren, nieces and nephews of Glenn civil servant and support service contractors are invited to attend Take Our Daughters and Sons to Work Day at Lewis Field and Plum Brook Station, July 26. Look for details and registration information on Today@Glenn. POC: Nola Bland, 3-9343



### SAFETY AND HEALTH AWARENESS DAY

Mark your calendar for Tuesday, June 13, MIC Auditorium. Doors open at 8:30 a.m. for information booths. The program begins at 9 a.m.



### JULY OUTDOOR SIREN TESTING

The Emergency Management Office staff will conduct an audible siren test focusing on the "area evacuation" tone on Saturday, July 1, at Lewis Field. An outdoor "voice" test will be conducted at Building 3 on Wednesday, July 5.

POC: Allen Turner, 3-6826

### IFPTE LOCAL 28, LESA MEETING

LESA will hold its next membership meeting, Wednesday, July 12, noon, in the Glenn Employee Center's Small Dining Room.

Deadline for next calendar section is **June 23, noon**. News and feature stories require additional time.

New clip-and-save format! Cut along the dashed line to keep this calendar for your reference.

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



## Focus on Sustainability: Greening Glenn and the Local Community

Glenn's Green Earth Committee and the Environmental Management Office hosted the center's annual Sustainability Fair at Lewis Field, May 3. Employees learned about products and practices that protect the environment while perusing items from local vendors who keep sustainability as a top priority in their products. Thomas Hartline, Glenn's Sustainability Officer, and Sandra Albro, Cleveland's Botanical Gardens Research Associate, Applied Urban Ecology, addressed the value of sustainability practices. Additionally, throughout the months of April and May, organizations within the center supported events around this theme. They included a discussion on steelhead fishing opportunities in the Rocky River led by Cleveland Metroparks' Aquatic Biologist Mike Durkalec; the annual Garlic Mustard Pull to remove the invasive species and help maintain healthy ecosystems; and the Northeast Ohio Earth Day Coalition's EarthFest 2017 at the Cuyahoga County Fairgrounds.



GRC-2017-C-02384

Photo by Rami Daud

*Representatives from the Erie Shore Activists were among the many sustainability-minded vendors who attended the Sustainability Fair at Lewis Field.*



GRC-2017-C-01014

Photo by Marvin Smith

*Aquatic Biologist Mike Durkalec discusses Ohio's steelhead stocking program.*



GRC-2017-CN-00030

Photo by Bethany Eppig

*Ian Jakupca conducts a regenerative fuel cell demonstration for guests at EarthFest 2017.*



GRC-2017-CN-00031

Photo by Lisa Ramsey

*Left to right: Tom Miller, Bethany Eppig and Keith Martin participate in the annual garlic mustard pull at Lewis Field.*

### Emergency and Inclement Weather Lines

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

### Connect With Glenn

