



AeroSpace FRONTIERS

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Major Preparation Underway for Orion Tests

Activities are ramping up to prepare for the Orion Ascent Abort and European Service Module tests in the Space Environments Complex at Plum Brook Station. Only 3 months away, the Ascent Abort test article will be evaluated in the Acoustic Test Stand. In less than a year, the service module will be evaluated under rigorous space environmental conditions for NASA's first Exploration Mission. From acoustic test stand fabrication, cryofloor preparation, chamber and cryoshroud cleaning, chamber door refurbishment, heat flux system installation and transportation route assessment, our personnel are working cohesively with all our partners to assure test and mission success.

Thank you for working in a safe manner as we plan and execute these critical spaceflight tests.

AeroSpace Frontiers

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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: **S. Jenise Veris**, ATS

Design: **Jami Drost**, ATS

Managing Editor: **Kelly R. DiFrancesco**

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

Students Assist in Restoring Wetlands at Abram Creek

A grant from the National Fish and Wildlife Foundation is enabling NASA Glenn, the Rocky River Watershed Council and high school students to restore wetlands adjacent to a tributary of Abram Creek.



GRC-2018-C-01723

Photos by Marvin Smith

Rocky River Watershed Council's Jared Bartley, right, works with students to determine bankfull channel edges.

Fairview High School science teacher Sliwinski, left, and Glenn's Eppig, green coat, guide students in measuring phosphorous and nitrates in a water sample from Guerin Ditch.



On April 10, students from the Fairview High School Environmental Science class came to Lewis Field to take a series of samples aimed at determining the makeup and quality of the water. Since 2016 the students have been working under the direction of Rocky River Watershed Council Program Manager Jared Bartley, and Glenn's Natural Resources Program Manager Bethany Eppig and Environmental Scientist Stacey Yanetta (LEI).

"This project gets students out of the classroom and into the field of environmental science," Bartley said. "They'll not only help monitor the physical, chemical and biological factors of the creek but also help us develop a restoration plan."

During their recent visit, students measured water quality parameters such as pH levels, dissolved solids, salinity and phosphorous. They will compare data collected before the restoration of the flood plain adjacent to Guerin Ditch (headwater tributary to Abram Creek) and after the restoration to see if water quality has improved.

Fairview Park High School science teacher Colleen Sliwinski said the students are very excited to work with the Cuyahoga Soil & Water Conservation District and professionals at NASA Glenn. "This is an amazing opportunity for career development and to experience

what environmental professionals in the field do on a daily basis," she said.

Glenn's Yanetta sees many benefits to all the partners in this project. "This partnership showcases the center's commitment to environmental stewardship and educates students about the impacts of polluted storm water runoff on water quality in streams."

Editor's note: The grant is part of the National Fish and Wildlife Foundation's Five Star and Urban Waters Restoration Program. The goal is to sustain local natural resources for future generations by providing modest financial assistance to diverse partnerships toward improving water quality, watersheds and the species and habitats they support.

By Doreen B. Zudell



On the Cover:

Glenn Environmental Scientist Stacey Yanetta, left, guides Fairview High School student Victoria Griffiths in measuring dissolved oxygen and turbidity in Guerin Ditch. Fellow members of Griffiths' class are learning about environmental science through a partnership with NASA and the Rocky River Watershed Council Program.

Predicting the Life Span of Materials in Space



Almost every product we use has a shelf life. From milk and meat to laundry detergent and batteries, it's important to know when it's safe to use a product, and when it's time to replace it. But what about materials used for spacecraft?

It is vital for scientists to know exactly how long a material will last in outer space. So, Kim de Groh, Environmental Effects and Coatings Branch, is gathering data from the Materials International Space Station Experiment (MISSE) missions.

In April, de Groh sent 138 different material samples to the International Space Station as part of MISSE-9, which was launched on SpaceX CRS (cargo resupply)-14 aboard a Dragon spacecraft. These samples will be part of the first MISSE mission to use the space station's new external materials testing platform, the MISSE Flight Facility.

De Groh wants to know how long these materials will last in outer space and will learn this by analyzing the affects atomic oxygen and radiation have on exposed polymers, composites and coatings. The flight data is needed to predict spacecraft performance and durability.

On Earth, the oxygen we breathe is made of two atoms of oxygen (O_2), but in space the sun's rays break down O_2 into single oxygen atoms, creating atomic oxygen. When spacecraft, such as the space station and resupply vehicles, travel in low-Earth orbit, atomic oxygen can react with its surfaces, causing materials, such as polymers, to erode. In addition, radiation can cause spacecraft materials to become brittle and crack.

De Groh has been involved with the MISSE missions since they began in 2001, and through this research, de Groh and her colleague Bruce Banks, have developed a model to predict the erosion of materials in space. De Groh's MISSE data has already impacted spacecraft design choices for numerous Earth observing satellites.

MISSE-9 will expose materials in different flight orientations on the space station. This includes forward facing

known as ram, rear facing known as wake, space facing known as zenith, and Earth facing known as nadir. Flying samples in each orientation will show how the varying atomic oxygen and solar exposures in each position affect material.

“We will fly some of the same materials in different orientations, as the same material can react differently in each flight direction.”

—Kim de Groh

The researchers expect the highest exposure to atomic oxygen for the ram samples and the least exposure to atomic oxygen for the wake samples. The highest solar exposure is likely for the zenith samples and the lowest solar exposure for the nadir samples. Monthly photos will be taken of the samples while in space showing color changes or sample cracking.

After a year in space, the MISSE-9 samples will be returned to Earth for post-flight analyses. The data obtained from this mission will enable de Groh to make more accurate predictions of materials and component lifetimes in space, allowing engineers to build longer-lasting vehicles for spaceflight.

By Debbie Lockhart



Bridenstine Confirmed as NASA Administrator



Bridenstine

On April 19, the United States Senate confirmed Jim Bridenstine as the next NASA Administrator.

Vice President Mike Pence performed the swearing in ceremony at NASA Headquarters on April 23. Bridenstine served in the U.S. House of Representatives for the state of Oklahoma, where he held positions on the House Armed Services Committee and the Committee on Science, Space and Technology. Bridenstine also is a pilot in the U.S. Navy Reserve and the former executive director of the Tulsa Air and Space Museum & Planetarium.

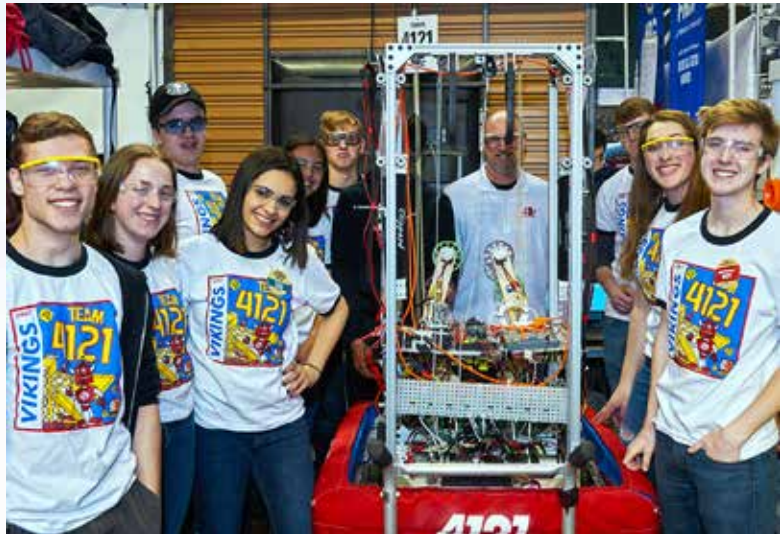
NEWS AND EVENTS

Glenn Pumps Up the Power to Buckeye Regional



GRC-2018-CN-00010

Brown-Houston on the game floor following the award presentation.



GRC-2018-CN-00011

Photos by Tim Dedula

North Canton's Viking Robotics, Team 4121, in the pits during a break in action.

More than 1,400 high school students from Ohio, New York, Pennsylvania, Florida, Kentucky, West Virginia, New Jersey, Iowa, Tennessee and South Carolina competed in the 17th annual Buckeye Regional FIRST (For Inspiration and Recognition of Science and Technology) Robotics Competition. The 3-day tournament themed "FIRST POWER UP" was held in Cleveland State University's Wolstein Center, March 29 to 31.

This year, Glenn's **Stephanie Brown-Houston**, the Buckeye Regional project manager and a long-standing game referee, was awarded the regional Outstanding Volunteer of the Year. The FIRST Program considers its volunteers' willingness to share their time and talents, at the heart of the program's success.

Annually, NASA Glenn's Office of Education is the largest sponsor of the Buckeye Regional in terms of volunteers and grants, and this year was no exception. Glenn awarded grants totaling \$23,000 that enabled 11 teams to compete, including **Team 4121 Viking Robotics, North Canton, Ohio**. The team enjoyed a great tournament outing, winning the Entrepreneurship Award, sponsored by Kleiner, Perkins, Caufield and Byers; the Innovation in Control Award sponsored by Rockwell Automation; and an invitation to the FIRST Championship in Houston, Texas, as a regional finalist.

FIRST is an international organization that inspires students to study science, technology, engineering and math by engaging them in robotics. All FIRST contestants are eligible to apply for a share of nearly \$50 million in scholarships.

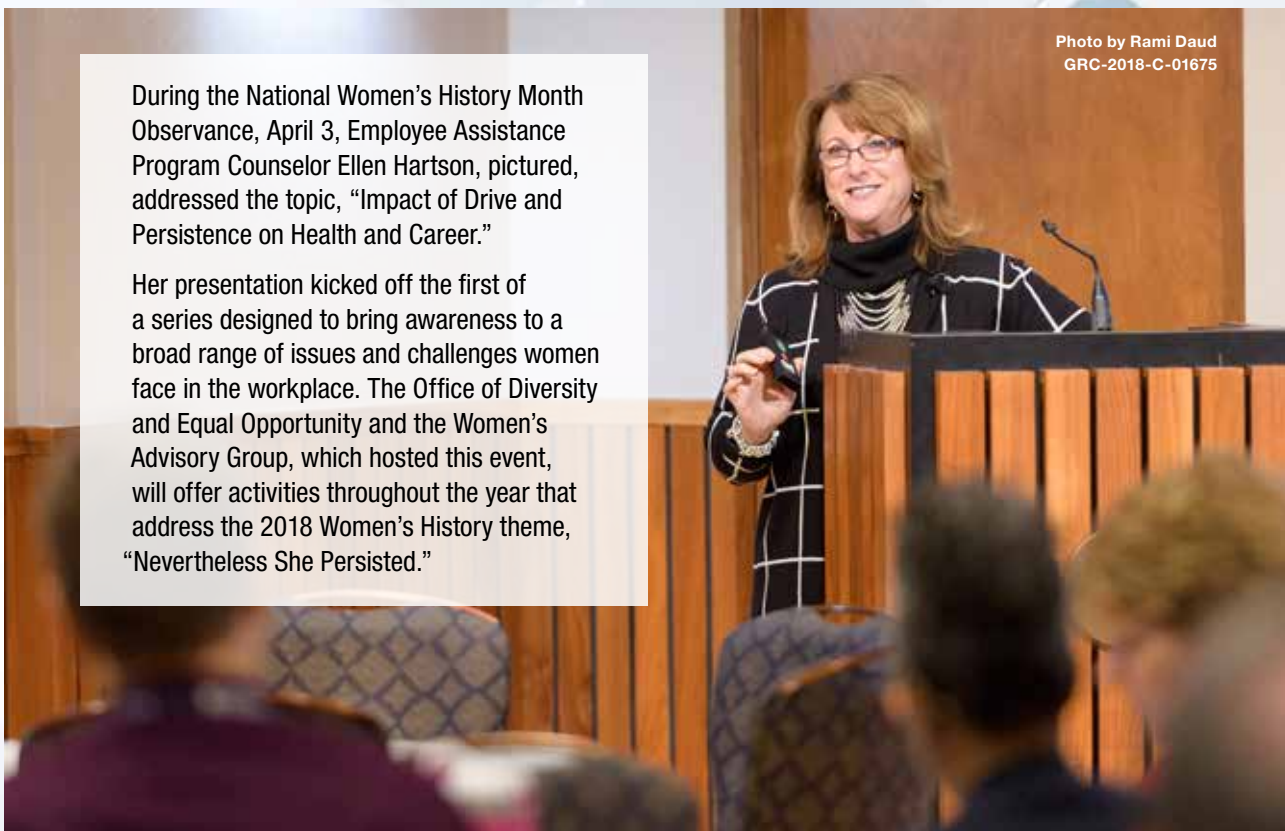
By S. Jenise Veris

Women's History Month Observance Kicks Off Series

During the National Women's History Month Observance, April 3, Employee Assistance Program Counselor Ellen Hartson, pictured, addressed the topic, "Impact of Drive and Persistence on Health and Career."

Her presentation kicked off the first of a series designed to bring awareness to a broad range of issues and challenges women face in the workplace. The Office of Diversity and Equal Opportunity and the Women's Advisory Group, which hosted this event, will offer activities throughout the year that address the 2018 Women's History theme, "Nevertheless She Persisted."

Photo by Rami Daud
GRC-2018-C-01675



GRC-2018-C-01683

Photo by Rami Daud

Computer Science Day Helps Youth Explore STEM Careers

Middle school students learned basic computer science principles while taking part in aerospace-themed activities and interacting with Glenn researchers and scientists during Computer Science Day at Lewis Field, April 6. Deputy Chief Information Officer Louise Moroney and Rochelle May from the Flow Boiling and Condensation Experiment described how they use computing in their work at Glenn. Representatives of the Graphics & Visualization, Simulated Lunar Operations and Hyperspectral Imaging labs shared hands-on versions of computing projects they work with daily. Pictured are students using hand-built rovers to navigate the planetary terrain.



MAP: A Key Initiative in NASA's Operating Model

What's all this talk about MAP? Why is it important?

The Mission Support Future Architecture Program, or MAP, is NASA's next major optimization initiative following the Business Service Assessment (BSA). MAP will transform Mission Support Services from their current state to an enterprise operating model while maintaining mission focus, improving efficiency, ensuring local authority and valuing the workforce.

Mission Support Services provide the backbone capabilities that enable NASA's programs and projects. These services include the following: financial management, human capital, information technology, legislative affairs, strategic infrastructure, communications, education, procurement, protective services, small business, general counsel and diversity and equal opportunity.

MAP is focused on providing support to the missions with greater efficiency and cost-effectiveness and establishing more agile operations, while enhancing employee development opportunities. MAP is also committed to engaging the agency, centers and mission directorates throughout the process to ensure a transparent and collaborative transformation. Toward that goal, an All Hands meeting with NASA Headquarters' Mission Support Directorate staff on the topic of the MAP is scheduled for June 5. Stay tuned to *Today@Glenn* for information on the event.

Meanwhile, please check out the MAP website, which further explains the program, includes answers to frequently asked questions and provides the most current status on MAP projects. <https://inside.nasa.gov/msd/map>.

Oleson, Landis Among Phase 2 NIAC Award Winners

The NASA Innovative Advanced Concepts (NIAC) Program has chosen Glenn's Steve Oleson, COMPASS Conceptual Spacecraft Design team lead, and Dr. Geoffrey Landis, Photovoltaic and Electrochemical Systems Branch, to advance a proposal for Phase 2 of NIAC's portfolio of leading-edge concepts. Also supporting the proposal were Glenn's Anthony Colozza, Jason Hartwig and Steven McCarty, as well as Noam Izenberg of Johns Hopkins University Applied Physics Laboratory.

The 2018 NIAC winners include nine Phase 2 proposals, including Oleson's ice-fueled hopper to explore an icy Neptune moon called Triton: Exploring Neptune's Captured Kuiper Belt Object. Oleson's Titan Submarine concept earned the same honor in 2015. Awards under Phase 2 of the NIAC program can be worth as much as \$500,000 for 2-year studies and allow proposers to further develop Phase 1 concepts that successfully demonstrated initial feasibility and benefit.

For more information on Phase 2 goals of the Triton concept and a list of the other 2018 NIAC award-winning concepts, visit: <https://www.nasa.gov/press-release/nasa-invests-in-shapeshifters-biobots-other-visionary-technology>.



Illustration of the Triton Hopper exploring Neptune.

Still at the Wheel of Change

Glenn Chapter of BPW Celebrates 50 Years

NASA Glenn's Chapter of the Business and Professional Women's (BPW) club commemorated its 50th anniversary jubilee with a capacity crowd at the Ohio Aerospace Institute, March 28.

The event acknowledged the importance of the 30 women who proudly took up the National BPW banner to establish the Lewis Chapter of BPW, as advocates for women's rights. Annie Easley, one of NASA's celebrated Hidden Figures, was a founding member. The club promoted career development programs, pay equity, work/life balance, workplace flexibility, health issues and more.

"We celebrate the accomplishments of these pioneering women and the club that continues to persevere and inspire young women, such as those gathered today from local universities and middle schools," said Amanda vonDeak, current Glenn BPW president.

Four of the founding members—Glenn retirees Sue Button-Winsa, Teri Horvath, Ellen Nachman and June Szucs—were among the guests. They championed Glenn's club and BPW's historical mission as a vehicle to drive change and empower women. That sentiment was echoed throughout the day's programming, which centered on the theme "Revving the Engine to Advance Women in Science and Leadership."

Center Director Dr. Janet Kavandi provided a keynote address during the luncheon for the golden jubilee. Programming also included a "Power Panel" of local women representing leadership in science, business and education. Several small business breakout sessions focused on topics ranging from workplace empowerment to establishing excellence.

The Glenn chapter has expanded its efforts to better the lives of women beyond the center's gate into the Greater Cleveland area. They have donated to food banks and supported local causes such as rape crisis centers and transitional housing for mothers in need.



GRC-1971-C-01322

Photo by NASA

Founding BPW officers Szucs, left, and Horvath demonstrate Safe Drivers Car Care, one of many workshops BPW co-sponsored early in its drive to empower working women.

Nearly 20 years ago, the chapter began awarding an annual Career Advancement scholarship. Over \$15,000 has been awarded to eligible women and men. Many of the past recipients have gone on to make technological accomplishments and hold leadership positions within the agency. Applications for the 2018–2019 academic year must be submitted on or before Friday, May 18, 2018. See *Today@Glenn* or call Jill Noble, 216–433–3711.

"Thanks to the support of BPW, women engaged in leadership and the pursuit of STEM careers at NASA have come a long way over the past 50 years," vonDeak said. "We are excited for the future!"

By S. Jenise Veris



Photo by Karen Edwards
GRC-2018-CN-00013

Center Director Dr. Kavandi, center, and members of the NASA Glenn Chapter of the BPW proudly assemble at the 50th anniversary celebration.

PROMOTIONS



Ferlin



Morgan

Timothy Ferlin has been selected Chief Safety and Mission Assurance officer for the Power Propulsion Element (PPE) Project in the Safety and Mission Assurance Directorate. Ferlin previously served as the Software Assurance Discipline Lead for a team tasked with meeting agency software assurance requirements across the center.

Tiffany Morgan has been selected deputy project manager for the Solar Electric Propulsion Project in the Space Technology Project Office of Glenn's Space Flight Systems Directorate. Morgan previously served as chief of the Engineering and Program Integration Division for the Air Force Space Command.

RETIREMENTS



Rice

Correction from the April issue of *AeroSpace Frontiers*:

Rowena M. Rice, Occupational Health Branch, Safety and Health Division, retired March 30, 2018, with 20 years of service.

AWARDS

Maroli Solves NASA@Work Challenge

John M. Maroli, Flight Software Branch, received a NASA@Work "Recognition of Excellence" for his solution to one of two problems posted in the challenge: "How Do We Predict the Future." Maroli formulated a machine learning problem for predicting the probability/risk of future safety incidents using various safety-related metrics, which include the number of safety permits held, employee density, employee service years, facility age, facility type and other seasonal/time metrics.



GRC-2018-C-01381

Photo by Rami Daud

Deputy Center Director Dr. Marla Pérez-Davis presents the NASA@Work Award to Maroli with his managers, Research and Engineering director Dr. Rickey Shyne, left, and Division Chief Derrick Cheston.

MORE THAN A MEMORY

John L. Pollack, 94, a 1979 retiree with 30 years of service, died Oct. 17, 2017. He was a U.S. Army Air Corps veteran of World War II. Pollack headed the Optical Measurements Section of the Instrument and Computing Division. Pollack developed a solar light source to simulate the radiated light of the sun. This radiation helped simulate the space environment for testing power generation systems in the vacuum chamber of the Space Power Facility at Plum Brook. His brother, Frank, a NASA retiree, died in March 2018.

Ray G. Sotos, 81, a 1994 retiree with 32 years of service, died March 24. Sotos was the first facility manager for the Zero Gravity Research Facility, which came online in 1966 for test support of numerous spaceflight experiments and ground-based science investigations. His expertise was critical in conducting a series of combustion experiments to determine the causes of the Apollo 13 fire. Sotos played a major role in designing the first low-gravity experiments conducted on the Learjet 25. His wife, Carol, is a NASA retiree. His daughter and son-in-law, Renee and Terrance Palyo, work at Glenn.



Sotos

Upcoming Center Events

Safety and Health Awareness Event June 26 to 28, 2018

- June 26 Lewis Field Program and Mishap Panel
9 a.m. to 2:45 p.m.
- June 27 Plum Brook Station Program and Health Walk
9 a.m. to 1 p.m.
- June 28 Lewis Field Health Walk
11 a.m. to 3 p.m.

Stay tuned to
Today@Glenn for details.

POC: Andrea Bonesteel, 3-2059



2018 Center Picnic Thursday, Aug. 23

11 a.m. to 2 p.m.

Lewis Field Picnic Grounds

Spread the Word—Retirees Are Welcome!

POC: Betsy Lavelle, 3-3198
Watch *Today@Glenn* for details.

ACTS 25th Anniversary Banquet



Friday, Sept. 14
5 to 10 p.m.

West Side Irish-American Club
8559 Jennings Road, Olmsted Township
\$40 per person, cash bar

ACTS alumni (anyone who worked on the project in any way) and one guest per attendee are invited. For more information, and to get on the email list, contact Alan.W.Hewston@nasa.gov, 216-433-3556; or Kathleen.A.Kelley@nasa.gov, 216-433-5180. Look for the RSVP deadline in the June *AeroSpace Frontiers*.



GSEL MOBILE LIBRARIAN

The Glenn Science and Engineering Library (GSEL) Mobile Librarian will be visiting building 110 through May 17 and building 162 from June 5 to 14. 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

RETIRED WOMEN'S LUNCHEON

The next NASA Retired Women's Luncheon will be held Thursday, May 17, at 1 p.m. at Olesia's Place, 11204 Royalton Road, North Royalton.

Please notify Gerry Ziemba at 330-273-4850 or gto64gerry@yahoo.com.

JUNE OUTDOOR SIREN TESTING

The Emergency Management Office staff will conduct an audible siren test on the "HAZMAT" tone at Lewis Field on Saturday, June 2. An outdoor mass notification "voice" test will be conducted at buildings 100 and 302 on Wednesday, June 6.

POC: Allen Turner, 3-6826

IFPTE LOCAL 28, LESA MEETING

LESA will hold its next membership meeting, Wednesday, June 13, noon, in the Glenn Employee Center's Small Dining Room.

Deadline for next calendar section is **May 16, 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>.



Water Summit Focused on Technical Solutions



Left to right: Glenn's Ray Wade and Tom Doehne; NASA Armstrong's Shaun Smith; LimnoTech's Greg Cutrell; and MAGNET's Joe Vinciguerra, with LimnoTech's buoy.

NASA Glenn's Regional Economic Development (RED) team and several partners connected companies with NASA experts for innovative technical solutions during the Midwest Water Initiative Summit at the Ohio Aerospace Institute (OAI), March 21. During the event, NASA researchers and physicists met with representatives from companies based in Ohio, Michigan, Texas and Wisconsin to help them solve problems relating to water. Glenn's Chief Technologist Dr. John Sankovic and OAI President Jeff Rolf provided welcoming remarks. The event also included tours of Glenn research facilities, and a GRC Connections that featured a panel discussion on water as an economic asset. Laurie Stauber, RED Level 2 program manager (acting), led the summit.

At left: Glenn subject matter experts and the Manufacturing Advocacy and Growth Network (MAGNET) facilitators pose for a photo with LimnoTech's Cutrell during the water summit.

Emergency and Inclement Weather Lines

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

Connect With Glenn

