



## Glenn Continues Its Legacy of R&D 100 Winners



Two more NASA Glenn research teams received the R&D Magazine’s prestigious R&D 100 Awards, presented at the 54th annual awards dinner on Nov. 3 in Oxon Hill, Maryland.

R&D 100 Awards honor the 100 most innovative technologies and services of the past year and are widely recognized as the “Oscars of Innovation.” The winners were selected by an independent panel of more than 50 judges and represent many of industry’s leading research and development companies and national laboratories, as well as many newcomers to the R&D 100 Awards.

Dr. Santo Padula II received the R&D 100 Award for developing a remarkable new “training” process for shape memory alloys (SMAs) that returns them to a previous form when heated. This new approach allows SMAs to be applied to complex

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## Center Director Holds All Hands Meeting



GRC-2016-08559

Photo by Marvin Smith

*Dr. Kavandi introduces the Glenn Senior Leadership Team to the workforce.*

Center Director Dr. Janet Kavandi held an All Hands Meeting, Oct. 31, to discuss activities at the center and answer employees’ questions. Having recently returned from the agency’s senior leadership meeting at Headquarters, Kavandi reported that the team discussed center roles and began planning for the transition of a new administration after the election. She said she and Glenn’s senior leaders recently gathered for a retreat where they developed their own set of seven expected behaviors for which they agreed to hold each other accountable. The resulting product was based on astronaut John Glenn’s desire to honor his fellow Mercury members by naming his capsule “Friendship 7” as he became the first American to orbit the Earth. Kavandi introduced members of her senior leadership team who helped create “Glenn’s 7 Expected Behaviors” and thanked them for their efforts over the past several months.

## AIM Day Gathered, Fostered Innovators Across the Agency

### *“Innovation*

*is in our DNA at NASA— who we are and what we do.”*

NASA Deputy Administrator  
Dr. Dava Newman

Deputy Administrator Dr. Dava Newman and the NASA FIRST 2016 Leadership Program participants hosted NASA’s first Agency Innovation Mission (AIM) Day, Nov. 1, with additional follow-on activities, Nov. 2. The event promoted, celebrated and sparked creativity and innovation within the agency. Newman addressed employees across the agency in a live broadcast from NASA’s Kennedy Space Center.

Center Director Dr. Janet Kavandi kicked off Glenn’s festivities, followed by Innovation Cleveland, which promoted local creativity and innovation resources. Sears think[box], Cleveland Public Library MakerSpace, and Glenn’s COMPASS and Creativity & Innovation teams participated.

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## Keep Safety in Your Holiday Spirit

During the holidays, we think of festivities associated with this time of the year. It is important to keep safety at the top of our “to do” list in the midst of our activities. Home decorating, cold weather driving and warm fires all pose unique safety hazards. You work hard throughout the year, and I encourage you to participate in holiday activities that offer much-deserved time with family, friends and coworkers. So let’s add the safety spirit to our holidays and keep it there throughout the coming year.

*Thank you for maintaining a heightened awareness of safety in and outside of the gates during this month and always!*

—Janet

## R&D 100 Awards

Continued from page 1

geometric components so that they may be used in a broader number of applications such as aerospace, aviation, automotive, medical and household appliances.

Glenn’s other winning team co-developed the Roll-Out Solar Array (ROSA) System along with Deployable Space Systems Inc. and the Air Force Research Laboratory. Team ROSA includes Michael F. Piszczor Jr. and Jeremiah S. McNatt of Glenn, as well as members of Deployable Space Systems Inc. in California and the Air Force Research Laboratory in New Mexico.

They received the R&D 100 Award for excellence in the development of advanced structures for high-power solar arrays that are stronger, lighter and package more compactly for launch. This technology investment furthers the agency’s deep space exploration goals and aids the commercial communications satellite industry, the provider of direct-to-home television, satellite radio, broadband Internet and a multitude of other services.

For information about training SMAs, visit

<http://technology.nasa.gov/t2media/tops/pdf/LEW-TOPS-32.pdf>.

For information about Roll Out Solar Array technology, visit

<http://www.nasa.gov/feature/roll-out-solar-array-technology-benefits-for-nasa-commercial-sector>.



Dr. Padula



Piszczor



McNatt

## Dr. Misra Appointed Deputy of R&E

Dr. Ajay K. Misra, a member of the Senior Executive Service, was appointed to serve as Deputy Director of NASA Glenn’s Research and Engineering Directorate, effective Oct. 30. Misra has more than 34 years of combined experience in research, program management, progressive management and executive experience at Glenn, NASA Headquarters and with industry.



Dr. Misra

Misra previously served as Chief of Glenn’s Materials and Structures Division. He oversaw the planning, organizing and directing of technology development, and demonstration of advanced materials and structures ranging from aerospace propulsion and power to space flight structures.

“Dr. Misra has completed notable detail assignments in headquarters’ Aeronautics Research Mission Directorate, including Acting Deputy Program Director and Program Director for the Fundamental Aeronautics Program,” said Center Director Dr. Janet Kavandi. “He also served as program executive for the Radioisotope Power Systems Program, managing development of advanced nuclear radioisotope power systems to power future robotic planetary science missions.”

“Dr. Misra has completed notable detail assignments in headquarters’ Aeronautics Research Mission Directorate, including Acting Deputy Program Director and Program Director for the Fundamental Aeronautics Program,” said Center Director Dr. Janet Kavandi. “He also served as program executive for the Radioisotope Power Systems Program, managing development of advanced nuclear radioisotope power systems to power future robotic planetary science missions.”



### Emergency and Inclement Weather Lines

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



STMD's Center Innovation Fund

## Opening Up Opportunities for Creativity Across the Agency



NASA Glenn scientists and engineers are exploring development of new technologies supported by the NASA Headquarters Space Technology Mission Directorate's (STMD) Center Innovation Fund (CIF).

The CIF program supports early-stage innovation in technology, where the main strategic objective is to stimulate innovative research and technology development. The goal is to transform NASA missions—in Human Exploration and Operations, Science, Space Technology, and Aeronautics—and advance the nation's capabilities.

“Following the May 17, CIF 2017 ‘Call for Proposals,’ 40 proposals were received from which 13 were awarded funding,” said Glenn's CIF Program Manager Gary Horsham. “On average, Glenn's CIF program will invest about \$110K per project for labor and procurement costs.”

According to Horsham, Glenn's CIF FY2017 program is investing in a wide range of projects. One project is exploring real-time measurement techniques for increased performance in wheel sinkage and slip for integration into Mars mobility systems. In another, a biomimetic advanced material is being developed as a potential alternative for construction of structures and habitats in cis-lunar space and beyond Earth orbit.

CIF proposals must align with agency strategic guidance, leverage NASA talent and capability, and represent a unique approach to resolving an agency or national need. Glenn's CIF program is conducted in a two-phased competitive process from May to September.

Phase I requires prospective principal investigators (PIs) to submit a 1-page quad chart to Glenn's CIF Program Manager and Chief Technologist. Can-

didates who advance to Phase II must then submit a detailed 5-page full proposal that is reviewed and scored by an independent panel of high-level Glenn technical managers. Those recommended to STMD must then participate in an agencywide “Candidates Selection and Confirmation” videoconference led by STMD officials to ensure strategic alignment, uniqueness and infusion potential value to the agency.

STMD invests a small fraction of its total funding in the CIF program annually. Funds are allocated to all NASA field centers—including the Jet Propulsion Laboratory. Partnerships among centers and with other agencies, research laboratories, academia and private industry are encouraged.

For more information about the Glenn CIF program and proposal process, contact Horsham at 216-433-8316 or [gary.a.horsham@nasa.gov](mailto:gary.a.horsham@nasa.gov).

## AIM Day

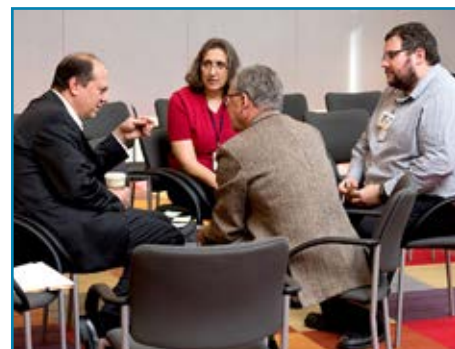
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The NASA Innovation Kick Start (NIKS) live event centered on 17 principal investigators from cross-center teams delivering 90-second pitches for their innovative ideas. Employees and a panel of senior leaders voted on which proposals would be awarded up to \$10,000 of procurement money to help kick start their ideas.

The Cleveland Space Cook-Off Challenge, hosted by Glenn's Betsy Turnbull, challenged two local chefs to use innovative techniques to create a meal using ingredients and appliances only found on the International Space Station.

Glenn's Chief Technologist, Dr John Sankovic, presented a TEDx talk titled “How NASA is Tapping the World's Biggest and Still Overlooked Pools of Innovation.” The day concluded with social networking and a robot-controlled car challenge, where centers virtually navigated an obstacle course.

On Nov. 2, Glenn employees shared their thoughts on the future of the agency in the NASA 2100 Challenge, followed by Human Innovation Training that promoted a mindset that supports and fosters innovation.



Chief Technologist Dr. Sankovic, left, and other AIM participants gather to discuss innovative ideas.



GRC-2016-08559

Photo by Marvin Smith

Dr. Kavandi answers questions during the Cook-Off Challenge, hosted by Turnbull, and featuring chefs April Thompson and Robert De La Ree.

Glenn's  
2016  
NASA FIRST  
Team

Lauren Ameen  
Jeffrey Csank  
Candace Johnson  
Valerie Wiesner  
Thomas Yohe

By Doreen B. Zudell

### Welcoming Native Americans to STEM Careers

Dr. Nizhoni Chow-Garcia, director of the Math, Science and Engineering Program at Hartnell College in California, addressed the theme “Strive, Rise and Thrive” during Glenn’s National Native American Month Observance, Nov. 8. Chow-Garcia works to increase access to higher education in science, technology, engineering and mathematics (STEM) careers for Native Americans and all people of color. She shared her research on the challenges Native Americans encounter when pursuing STEM careers and how to create a more welcoming environment for American Native students. Glenn’s Advisory Group for Native Americans sponsored the event.



*Dr. Chow-Garcia shares her research on Native Americans pursuing STEM careers.*

### Aiding Independence of People With Disabilities



*Noble and Darling, center, are pictured with a variety of adaptive technology and DAAG Chair Kathy Clark, left, and ODEO's Disability Program and Complaints Manager Angela Pierce.*

This year’s Disability Employment Awareness Program, held Oct. 25, featured Jill Noble, Glenn’s 508 coordinator, and William “Bill” Darling, director of Assistive Technology of Ohio, located at The Ohio State University. The presentation included an informative program that chronicled advancements in adaptive technology and a demonstration of adaptive devices currently available to help people with disabilities perform independently at work, school or home. Glenn’s Office of Diversity and Equal Opportunity (ODEO) and the Disability Awareness Advisory Group (DAAG) co-sponsored the program.

### Giving Thanks to Veterans and Those Who Support Them

Glenn’s Veterans Awareness Committee invited Maj. Christopher Zurawski, 310th Tactical Psychological Operations Company commander, to speak at this year’s Veterans Day Ceremony, Nov. 10. Zurawski, son of NASA retiree Ron Zurawski, said his experiences shaped his respect for military brotherhood and the importance of recognizing veterans along with those who support them. He explained that Veterans Day acknowledges not only the sacrifices of service members securing our assets in 173 countries but also family and friends who participate in patriotic activities to serve and support our troops.



*David Stringer, retired Brig. Gen. USAF and current director of Glenn’s Plum Brook Station facility, presents a token of appreciation to Maj. Zurawski.*

### Inspiring Students to Pursue Manufacturing Careers

NASA Glenn’s Office of Education partnered with the Manufacturing Advocacy and Growth Network (MAGNET) to host Manufacturing Day, Oct. 27. The event was devoted to inspiring students to pursue manufacturing careers. Center Operations Director Robyn Gordon welcomed nearly 100 students from seven area schools, who spent the day observing employees and exploring facilities that help make NASA innovation a reality. Prior to the facility tours, the students heard from a panel of manufacturing staff, who shared job experiences and their unique journey that inspired them to pursue a manufacturing career.



*Tom Vannuyen (center, back to camera), chief of the Machining Branch, explains the operation of Abrasive Water Jets to the students on a tour of Glenn’s Manufacturing Facility.*

*GRC-2016-C-09217  
Photo by Bridget Caswell*



## News and Events

# Glenn Fires Up Saffire-II

The Spacecraft Fire Experiment—II (Saffire-II) launched on the Orbital ATK Cygnus spacecraft on Oct. 17. It remained on Cygnus during the space station resupply mission. On Nov. 21, after Cygnus unberthed from the space station, NASA Glenn conducted Saffire-II when Cygnus reached a safe distance from the space station.

The Saffire-II investigation quantifies the flammability of several materials in microgravity and compares them to flammability limits in normal Earth gravity. Nine samples of varying materials burned inside the empty Cygnus resupply vehicle before it re-entered Earth's atmosphere.

Saffire-II is the second of a set of three experiments to be conducted on three consecutive flights of the Cygnus vehicle. They are designed to garner information that will protect astronauts on future deep space missions. Saffire-I, which flew on OA-6, investigated the development and spread of a large-scale low-gravity fire using one large sample (approx. 0.4 m wide by 0.94 m tall). Nine smaller samples were burned on Saffire-II, each having a dimension of 5 cm wide by 25 cm long.

For more information, visit

<https://www.nasa.gov/press-release/nasa-glenn-experiments-to-launch-on-iss-resupply-mission> and

<https://www.nasa.gov/saffire>.



## Ceramic Composites Revolutionize Aircraft Engines

Lighter, faster, more efficient. Whenever you advance a technology, that's the goal. As NASA looks to transform the commercial aircraft of the future, efficient engines are at the heart of it all.

To achieve the goal of better engines on future aircraft, researchers at NASA Glenn are investigating promising advances in high-temperature materials that can be used to make turbine engine components.

These materials, called ceramic matrix composites or CMCs, are lighter, stronger and can withstand the demanding forces of the extremely high temperatures generated in the core of jet engines. CMCs are in a position to replace the nickel-based super alloy metals in today's aircraft engines.

In general, the hotter an engine runs, the better the fuel efficiency. Over the years, engines have been able to run hotter because metal parts were treated with thermal barrier coatings. But there is a limit to what the coatings can tolerate. CMCs, on the other hand, can withstand temperatures up to 2700 degrees Fahrenheit and beyond with the help of specially designed ceramic

coatings called environmental barrier coatings.

"We want to understand how CMCs and protective coatings can not only withstand high heat, but also environmental particle hazards such as dust, sand and volcanic ash," said Valerie Wiesner, Ceramic and Polymer Composites Branch. "This is important because, as aircraft engine temperatures increase to promote fuel efficiency, sand, when it's ingested into an engine, can actually melt into glass and potentially cause power loss or failure."

Moving next generation aircraft toward greater operating efficiency will depend, in large part, on advances in engine technology and materials manufacturing capabilities. Glenn researchers are exploring the 3D printing and testing of complex materials like CMCs to see if they can withstand the high-temperature environment of future aircraft engines.

This research is conducted in support of NASA's Transformative Aeronautics Concepts Program.

By Nancy Smith Kilkenny



GRC-2016-C-06784

Photo by Rami Daud

*Wiesner observes the research she is conducting in ceramic matrix composite components for next generation aircraft engines with Michael Cuy, test engineer.*

# Glenn's World-Class Inventors Recognized for Technological Contributions

The 2016 Technology Transfer Inventors Recognition Event was held on Oct. 19, honoring NASA Glenn inventors who filed a patent application, received a patent or software release, or won a technology-based award during fiscal year 2015. All were recognized by Headquarters and center management, as well as their peers for their accomplishments.

The event featured innovator Dr. Santo Padula II, who shared how Glenn's Technology Transfer Office and Legal Office worked side by side to help him find the best commercial applications for his technology, and just as important, listened to his vision for the technology. Padula noted a paradigm shift occurred when he thought more about the depth and importance of his research. "I realized my technology could not only solve a NASA challenge, but also address problems that private industry faces," Padula said.

Kim Dalglish-Miller, Technology Transfer Office chief, affirmed, "Glenn had a record breaking year by securing more licenses than we had in the previous 10 years combined—and it all started with your technology. You are the heart and soul of the cutting-edge research being developed at Glenn."

Closing the event, Dan Lockney, Technology Transfer Program executive, recognized Glenn's Technology Transfer Office with an agency trophy. The center set an all-time agency record with 23 licenses signed, covering 51 technologies, in fiscal 2016.

View the full list of awardees at <http://events.grc.nasa.gov/techtransfer/>.



GRC-2016-C-08504

Photo by Bridget Caswell

*Dr. Padula, featured innovator, shares details about the commercialization of his technology with his peers.*

## More Than a Memory



Allen

**John L. Allen**, 94, a 1986 retiree with 40 years of federal service, died June 21. Allen was a U.S. Air Force veteran of World War II who joined the NASA workforce after graduating from Purdue University as an aeronautical engineer. During his 38 years of NASA service, Allen's research and papers focused on air-breathing propulsion applications. He retired from the Advanced Planning and Analysis Office. Allen participated in several professional engineering organizations.



Hall

**Jesse N. Hall**, 70, a 2006 retiree with 17 years of federal service, died Oct. 15. Hall retired from NASA's Resources Analysis and Management Division, where he first served as contractor before being converted to a civil servant, working as a budget analyst in both programmatic and institutional areas. Hall also served as a mentor for NASA's Shadowing Program (1998-1999), which provides selected high school students an opportunity to explore a variety of career possibilities.

**Joseph P. Olsavsky**, 84, a 1993 retiree with 30 years of federal service, died in Jan. 2016. Olsavsky was a U.S. Army veteran who served NASA Lewis the majority of his career as an electronics technician in the Test Installation Division. He retired from the Communications and Electronics Branch of the division, where he received a Group Achievement award for his support to the "Backward Wave Oscillator and Traveling Wave Tube Effort."

**Donald T. Worden**, 90, a 1987 retiree with 24 years of federal service, died Oct. 30. Worden was a U.S. Navy veteran of World War II and a member of the NASA Servicemen's Club. Worden was a technician who provided sustained superior service to the Space Flight Systems Directorate and the Flight Operations and Research Instrumentation Branch before retiring from the Fabrication Support Division.

**Awards**

**Connolly Named One of Crain’s Forty Under 40**



*Connolly*

Glenn’s Joseph W. Connolly was selected for the 2016 Crain’s Cleveland Business “Forty Under 40” class of outstanding young professionals throughout Northeast Ohio. Connolly, an aerospace engineer serving NASA Glenn as a control systems engineer in the Intelligent Control and Autonomy Branch, was honored Nov. 21 during an awards reception. He joins a distinguished group of individuals honored for their professional success and civic contributions, which play a critical role in the region’s development and vision.

**Dr. Biaggi-Labiosa Selected HENAAC Honoree**



*Dr. Biaggi-Labiosa*

The Great Minds in STEM organization saluted Dr. Azlin M. Biaggi-Labiosa as their “Most Promising Engineer With a Ph.D.” during the Hispanic Engineer National Achievement Award Conference (HENAAC), Oct. 5-9. Biaggi-Labiosa, who manages the Nanotechnology Project in Glenn’s Space Technology Project Office, joins the 28th class of HENAAC honorees recognized as phenomenal role models in science, technology, engineering and math.

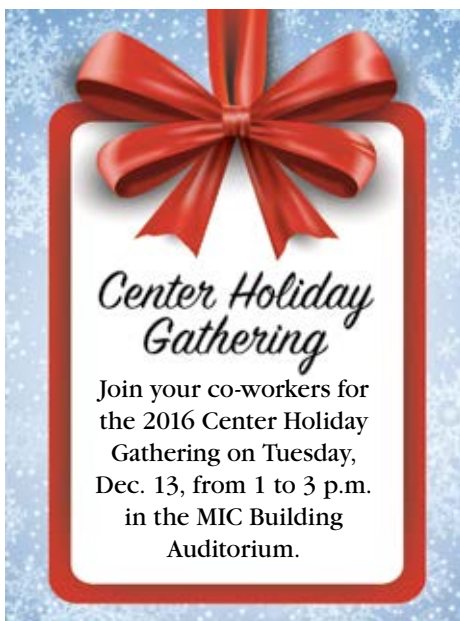
**Calendar**

**JANUARY SIREN TESTING:**

The Emergency Management Office staff will conduct the Lewis Field outdoor “voice” test at Building 3 on Wednesday, Jan. 4. An audible siren test focusing on the “tornado” tone will be held at Lewis Field on Saturday, Jan. 7. POC: Allen Turner, 3-6826.

**IFPTE LOCAL 28, LESA MEETING:**

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



**CFC Runs Through Dec. 30**

Glenn’s 2016 Combined Federal Campaign (CFC) runs through Friday, Dec. 30, 2016. Federal employees have the chance to make a real impact in our communities through the CFC’s vast network of deserving nonprofit organizations at home and around the country that urgently need our help.



**Two Engineers Honored as Technology Rising Stars**

The Careers Communications Group named Dr. Diana Santiago-DeJesus and Dr. Tiffany Williams, research engineers in Glenn’s Materials and Structures Division, among its 2016 Technology Rising Stars in STEM careers. They received the award during the annual Women of Color STEM Conference, Oct. 13-15.

Santiago-DeJesus is a co-principal investigator of M-SHELLS, a sub-project of the Convergent Aeronautics Solutions, exploring the combination of energy storage devices with structural materials to save weight on planes.

Williams is the materials development lead for the Structural Nanomaterials project focused on developing a high-strength, lightweight nanocomposite overwrap for pressure vessel applications.



*Dr. Santiago-DeJesus*



*Dr. Williams*



## National Aeronautics and Space Administration

### John H. Glenn Research Center at Lewis Field

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

# It's Electric! Glenn Engineers Test Next Generation Aircraft

Electric cars are nothing new, they're more efficient, produce less noise and emit less carbon into the atmosphere. This is exactly why engineers from NASA Glenn are taking this technology to the skies.

"As large airline companies compete to reduce emissions, fuel burn, noise and maintenance costs, it is expected that more of their aircraft systems will shift to using electrical power," said Dr. Rodger Dyson, Glenn's Hybrid Gas Electric Propulsion technical lead.

Using Plum Brook Station's newest facility—NASA's Electric Aircraft Testbed (NEAT)—these engineers design, develop and test systems for the next revolution in aviation—electric aircraft.

During NEAT's first test in September, Dyson's team used 600 volts of electricity and successfully tested an electrical power system that could realistically power a small one- or two- person aircraft.

Once complete, NEAT will be a world-class, reconfigurable testbed that will be used to assemble and test the power systems for large passenger airplanes with over 20 megawatts of power.

"What we're hoping to learn now is how to make it more efficient and light-

weight," said Dyson. "Next year we're going to upgrade the size of these motors—we'll use the same technology to test the higher-power stuff next."

By increasing efficiency and reducing weight, the technology developed here can eventually be applied to larger, commercial aircraft, potentially result-

ing in reduced flying costs for airline companies and travelers.

NEAT's future is bright, and Glenn's engineers are hopeful it will spark a change in the airline industry.

"We look forward to making a difference in aviation," said Dyson.

By Deborah Lockhart



*Engineers design, develop and test systems for the next revolution in electric aircraft aviation in the NEAT facility.*