2017

A Spotlight on the R&D of Federal Laboratories

AFRL
THE AIR FORCE RESEARCH LABORATORY
LEAD | DISCOVER | DEVELOP | DELIVER

Roll-Out Solar Array

See inside cover for details

FLC
Federal Laboratory Consortium
for Technology Transfer

federallabs.org

On the Cover

Roll-Out Solar Array (ROSA)

Traditional satellite solar panels use large-area honeycomb structures that accordion fold and use motor-driven, synchronized mechanical hinges to deploy on-orbit. The Air Force Research Laboratory Space Vehicles Directorate has broken that paradigm by developing the roll-out solar array, or ROSA, which uses stored strain-energy in composite slit-tube booms to deploy a flexible array, thereby eliminating a significant portion of the complex, expensive, and heavy components used on traditional solar panels. ROSA shrinks the stowed volume by a factor of six, reducing launch costs, and its thin mesh blanket and composite boom structure improve mass by 25 percent, increasing satellite mission performance.

AFRL Space Vehicles Directorate

Located at Kirtland Air Force Base, N.M., the Space Vehicles Directorate serves as the Air Force's Center of Excellence for space technology research and development, and develops and transitions space technologies to provide space-based capabilities to the warfighter while always addressing affordability, efficiencies, and operations need. The Directorate operates on 438,000 square feet of laboratory and office space, and supports over 50 state-of-the-art research laboratories and testing structures at Kirtland.

www.kirtland.af.mil/Units/AFRL-Space-Vehicles-Directorate

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Photo credit: Tom Jones, NASA (cover); Anita Collins, AFRL

AFRL scientist Paul Hausgen demonstrates deploying the composite roll-out solar array slit-tube boom. The booms do not require external power, but deploy under their own stored-strain energy.

About the FLC

FLC
Federal Laboratory Consortium
for Technology Transfer

Formally chartered by the Federal Technology Transfer Act of 1986, the Federal Laboratory Consortium for Technology Transfer (FLC) is a nationwide network of over 300 federal laboratories, agencies, and research centers that fosters commercialization best practice strategies and opportunities for accelerating technologies from out of the lab and into the marketplace. The American taxpayers' investment in our national laboratories' research and development (R&D) efforts has spurred scientific and technological breakthroughs that can return dividends for our economy, such as creating new industries, businesses, and jobs, when introduced to the marketplace.

The FLC's mission is to promote, educate, and facilitate federal technology transfer (T2) among its member labs and institutions so they can commercialize technologies and create social and economic impacts with new innovative technologies. Through the various resources, education and training, tools, and services the FLC creates and provides for its members, federal labs are better able to create partnerships, navigate the commercialization process, and achieve market success.

By serving as the touch point for T2 communication, education, and open data services tools, the FLC plays a central role in providing the skilled T2 workforce that our country desperately needs. These highly motivated T2 professionals are the driving force behind improving federal labs' ability to effectively partner with the private sector. The FLC strives to support the dedicated individuals who make up the federal laboratory system by continuing to serve as a gateway for industry, government, and academia to access R&D in an effort to stimulate our nation's economic health.

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FLC Regions

1 Far West
Regional Coordinator: Jennifer Stewart
Naval Surface Warfare Center,
Corona Division
www.flcfarwest.org

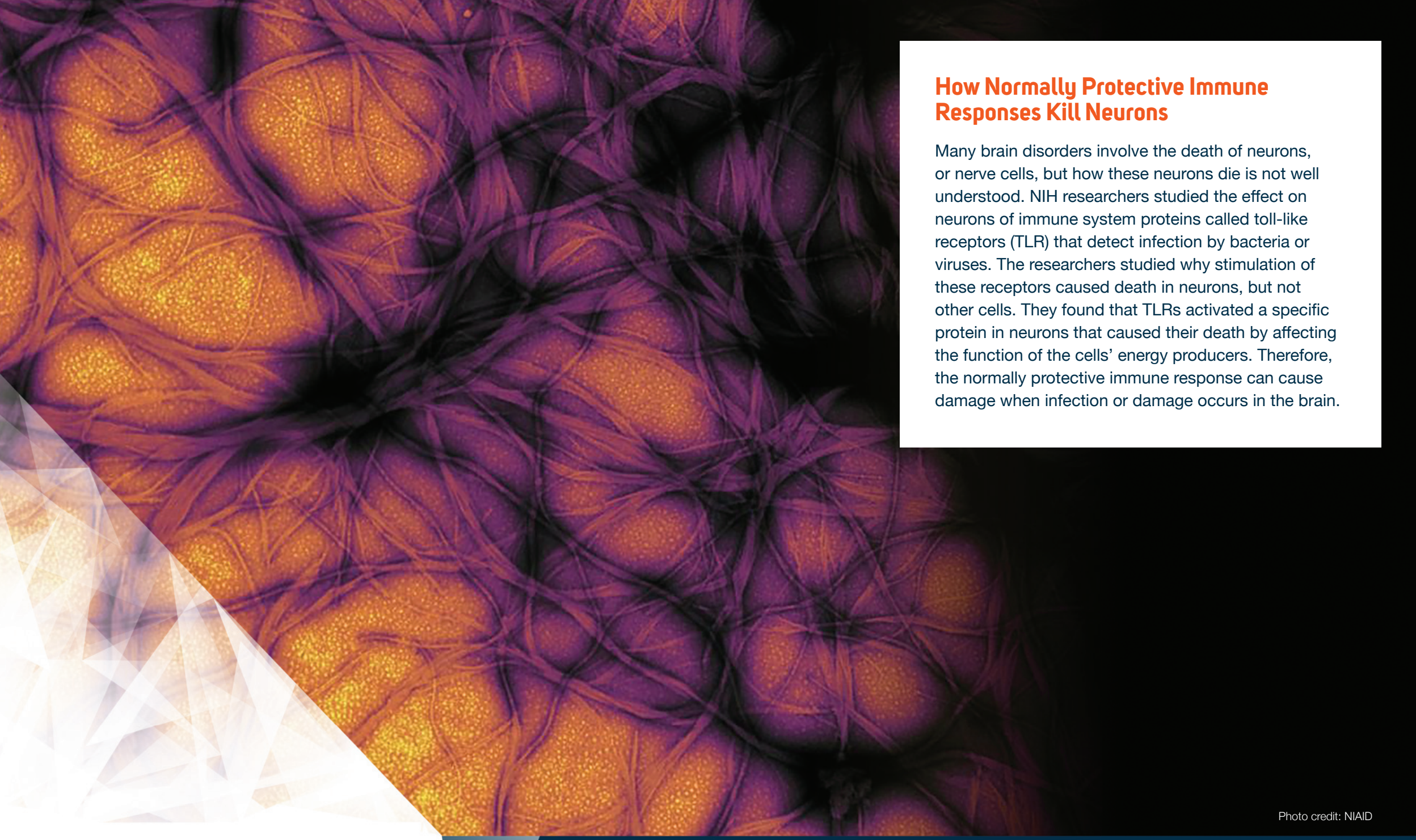
2 Mid-Continent
Regional Coordinator: Jack James
NASA Johnson Space Center
www.flcmidcontinent.org

3 Midwest
Regional Coordinator: Brooke Pyne
Naval Surface Warfare Center,
Crane Division
www.flcmidwest.org

4 Northeast
Regional Coordinator: Valerie Larkin
Naval Undersea Warfare Center
Division Newport
www.flcnortheast.org

5 Mid-Atlantic
Regional Coordinator: Robert Griesbach, Ph.D.
USDA-Agricultural Research Service
www.flcmidatlantic.org

6 Southeast
Regional Coordinator: Jeremy Benton
Y-12 National Security Complex
www.flcsoutheast.org



How Normally Protective Immune Responses Kill Neurons

Many brain disorders involve the death of neurons, or nerve cells, but how these neurons die is not well understood. NIH researchers studied the effect on neurons of immune system proteins called toll-like receptors (TLR) that detect infection by bacteria or viruses. The researchers studied why stimulation of these receptors caused death in neurons, but not other cells. They found that TLRs activated a specific protein in neurons that caused their death by affecting the function of the cells' energy producers. Therefore, the normally protective immune response can cause damage when infection or damage occurs in the brain.

Photo credit: NIAID

National Institute of Allergy and Infectious Diseases

Neuroimmunology Section, Laboratory of Persistent Viral Diseases (LPVD), National Institute of Allergy and Infectious Diseases (NIAID)

Dr. Karin Peterson, from the Neuroimmunology Section, Laboratory of Persistent Viral Diseases (LPVD), NIAID, and her research group study virus infections of the brain, including La Crosse and Zika viruses. They study the immune response to these viruses and how these responses affect neuronal damage and disease development. Other LPVD groups study neurological diseases induced by misfolded proteins, as well as neurological and non-neurological retroviral infections, including HIV.

www.niaid.nih.gov

December 2016

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November 2016 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	January 2017 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31			1	2	3
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25 Christmas Day	26	27	28	29	30	31

3D Printed Wind Turbine Blade Mold

Researchers at Oak Ridge National Laboratory are applying 3D printing technology to wind turbine blade mold manufacturing. Currently, the processes used to manufacture wind turbine blades—which can average over 150 feet in length—are complex, energy-intensive, and time-consuming. Trends toward larger blades, coupled with the drive for global competitiveness, inspired the Energy Department's Wind Program and the Advanced Manufacturing Office to explore new manufacturing technologies. The blades were designed by Sandia National Laboratories, will undergo static and fatigue testing at the National Renewable Energy Laboratory, and will then be operated at the DOE's Sandia Scaled Wind Farm Technology (SWiFT).

Photo credit: Oak Ridge National Laboratory

OAK RIDGE National Laboratory

Oak Ridge National Laboratory (ORNL)

ORNL is a multiprogram science and technology laboratory managed for the U.S. Department of Energy by UT-Battelle, LLC. Scientists and engineers at ORNL conduct basic and applied research and development to create scientific knowledge and technological solutions that strengthen the nation's leadership in key areas of science; increase the availability of clean, abundant energy; restore and protect the environment; and contribute to national security.

www.ornl.gov

January

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1 New Year's Day	2	3	4	5	6	7
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December 2016

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February 2017

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Diver Augmented Vision Display (DAVD)

The Diver Augmented Vision Display (DAVD) prototype uses waveguide optical display technology integrated into the U.S. Navy KM-37 dive helmet to provide high-resolution, see-through, heads-up display capability for a diver working in the harsh maritime environment. The waveguide modules are similar to those used in smart glasses and can display sonar, text messages, videos, schematics and augmented reality imagery to support ship husbandry, salvage, underwater construction, and related military dive missions. This game-changing capability also has application for the public safety, commercial, and scientific diving communities operating in low-visibility underwater conditions to keep users safer and more efficient underwater.

Photo credit: E.J. Hersom, Richard Manley, William Hughes

Naval Surface Warfare Center (NSWC), Panama City Division

NSWC, Panama City Division is the Technical Center of Excellence for Littoral Warfare and Coastal Defense. The mission of NSWC Panama City Division is to conduct research, development, test and evaluation, in-service support of mine warfare systems, mines, naval special warfare systems, diving and life support systems, amphibious/expeditionary maneuver warfare systems, and other missions that occur primarily in coastal (littoral) regions, and to execute other responsibilities as assigned by Commander, NSWC.

www.navsea.navy.mil/Home/Warfare-Centers/NSWC-Panama-City

February

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19	20 Presidents' Day	21	22	23	24	25
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Post-crash Fuel Fire Ignition

Photo shows the ignition of 55 gallons of jet fuel adjacent to a 707 test fuselage inside of the FAA's full-scale fire test facility. This test replicates an external post-crash fuel fire scenario. The test scenario is conducted either with an initial opening adjacent to the fuel fire to study the spread of fire on interior cabin materials, or with the opening blocked by aluminum or composite fuselage structure and insulation to study fuselage burn-through behavior.

Photo credit: Laurie Zaleski and Michael Gross

William J. Hughes Technical Center

The FAA William J. Hughes Technical Center is the nation's premier air transportation system laboratory. The Tech Center's workforce conducts test and evaluation, verification and validation, and sustainment of the FAA's full range of aviation systems, and develops scientific solutions to current and future air transportation safety challenges by conducting applied research and development. Additionally, the Center provides the gateway for National Airspace System upgrades, improvements, and operational sustainment.

www.tc.faa.gov

March

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February 2017 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	April 2017 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23/30 24 25 26 27 28 29		1	2	3	4
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Laser-Guided Intelligent Sprayer Technology for Reduced Pesticide Use

A laser-guided intelligent sprayer was developed by USDA-ARS scientists and university collaborators for optimized pesticide application based on plant canopy structure. This sprayer is compatible with diverse crop architectures and reduces pesticide use by up to 70%, airborne spray drift up to 87%, and spray loss on the ground up to 93%. This technology offers an environmentally responsible approach to insect pest and plant disease management by reducing pesticide use, production costs and worker exposure.

Photo credit: Heping Zhu, USDA-Agricultural Research Service

USDA ars

USDA-ARS Application Technology Research Unit

The USDA, Agricultural Research Service, Midwest Area, Application Technology Research Unit located in Wooster, Ohio, incorporates engineering, entomological, plant pathological and horticultural principles to develop innovative and improved technologies, and conducts basic and applied research to protect floricultural, nursery, landscape, horticultural, greenhouse, and field crops against damage from diseases, pests, and adverse environmental conditions while safeguarding environmental quality, food and worker safety.

www.ars.usda.gov

April

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March 2017 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	May 2017 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31					1
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23 / 30	24	FLC National Meeting For more information visit meeting.federallabs.org SAN ANTONIO April 25 - 27, 2017			28	29

ANNIE Detector Assembly

Carrie McGivern prepares photomultiplier tubes during ANNIE detector assembly. The Atmospheric Neutrino Neutron Interaction Experiment (ANNIE) is designed to measure the neutron yield of atmospheric neutrino interactions in gadolinium-doped water. One important component of the ANNIE design is the use of precision timing to localize interaction vertices in the small fiducial volume of the detector. To achieve this, researchers are using early prototypes of large area picosecond photodetectors (LAPPDs), now in the commercialization phase.

Photo credit: Fermi National Accelerator Laboratory

Fermilab

Fermi National Accelerator Laboratory

Fermilab is America's premier laboratory for particle physics and accelerator research, funded by the U.S. Department of Energy. By inventing, building and operating some of the largest and most complex scientific instruments in the world, scientists at Fermilab expand humankind's understanding of matter, energy, space and time. More than 4,000 scientists from universities and laboratories in 44 countries use Fermilab and its accelerators, detectors and computers for their research.

www.fnal.gov

May

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28	29 Memorial Day	30	31			

April 2017

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June 2017

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Arctic Warming

Scientists fly over the Arctic tundra, measuring carbon dioxide and other gases. The results help them understand and model the pace of Arctic warming using the U.S. Department of Energy's ground-based and aerial infrastructure. Seen from above, Arctic ice is thawing faster due to rising air temperatures, which release carbon dioxide and methane—two greenhouse gases that affect the amount of radiant energy that can reach or leave the Earth.

Photo credit: NASA and Pacific Northwest National Laboratory

Pacific Northwest
NATIONAL LABORATORY

Pacific Northwest National Laboratory (PNNL)

Interdisciplinary teams at Pacific Northwest National Laboratory address many of America's most pressing issues in energy, the environment, and national security through advances in basic and applied science.

www.pnnl.gov

June

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May 2017 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	July 2017 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23/30 24/31 25 26 27 28 29			1	2	3
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Fiber Optic Shape Sensing

NASA Langley Research Center has demonstrated a patented method and apparatus for determining the position, in three dimensions, of any point on an optical fiber. This innovative position detection method offers 10 times greater positional accuracy than comparable optical techniques. Practical applications include structural health monitoring for aerospace vehicles, position tracking for cabled remote vehicles, and minimally invasive surgical devices.

Photo credit: NASA Langley Research Center

LANGLEY
RESEARCH
CENTER

NASA Langley

Langley Research Center (LaRC) is the oldest of NASA's field centers, located in Hampton, Virginia, United States. It directly borders Poquoson, Virginia and Langley Field. LaRC focuses primarily on aeronautical research, although the Apollo lunar lander was flight-tested at the facility and a number of high-profile space missions have been planned and designed onsite. Established in 1917 by the National Advisory Committee for Aeronautics, the Center currently devotes two-thirds of its programs to aeronautics and the rest to space.

www.nasa.gov/centers/langley

July

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Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
June 2017 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	August 2017 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31					1
2	3	4 Independence Day	5	6	7	8
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16	17	18	19	20	21	22
23 30	24 31	25	26	27	28	29

Integrated Respiratory and Eye Protective Scarf (IREPS)

The Integrated Respiratory and Eye Protective Scarf, or IREPS, was developed by the U.S. Army Edgewood Chemical Biological Center (ECBC) to protect warfighters and first responders from riot-control agents as simply and quickly as putting on a surgical mask. It is comfortable and can be donned without removing any headgear. IREPS includes a material with one-way stretch so it can be pulled around the user's headphone ear cups as well as the back of the protective helmet for full protection. It is small and light; the user can easily stow it in a pocket when not in use.

Photo credit: ECBC Public Affairs

Edgewood Chemical Biological Center (ECBC)

ECBC is the Army's principal research and development center for chemical and biological defense technology, engineering and field operations. ECBC has achieved international recognition for major technological advances for the warfighter and for national defense, and has a long and distinguished history of providing the Armed Forces with quality systems and outstanding customer service. ECBC is a U.S. Army Research, Development and Engineering Command laboratory located on Aberdeen Proving Ground, Md.

www.ecbc.army.mil

August

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Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
July 2017 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23/30 24/31 25 26 27 28 29	September 2017 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	1	2	3	4	5
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Time of Flight Secondary Ion Mass Spectrometer

The Time-of-Flight Secondary Ion Mass Spectrometer (TOF-SIMS) provides Naval Surface Warfare Center (NSWC) Crane Division scientists with trace molecular analysis and sub-micron surface measurements to probe the reliability of strategic systems hardware. The TOF-SIMS delivers a complete ion signature achieved by means of a surface rasterization with a focused ion beam. Complementary images are generated using the discrete elemental or molecular ion intensities to diagnose root-cause subcomponent failures of microelectronics, as displayed for a surface-mounted microelectronic resistor.

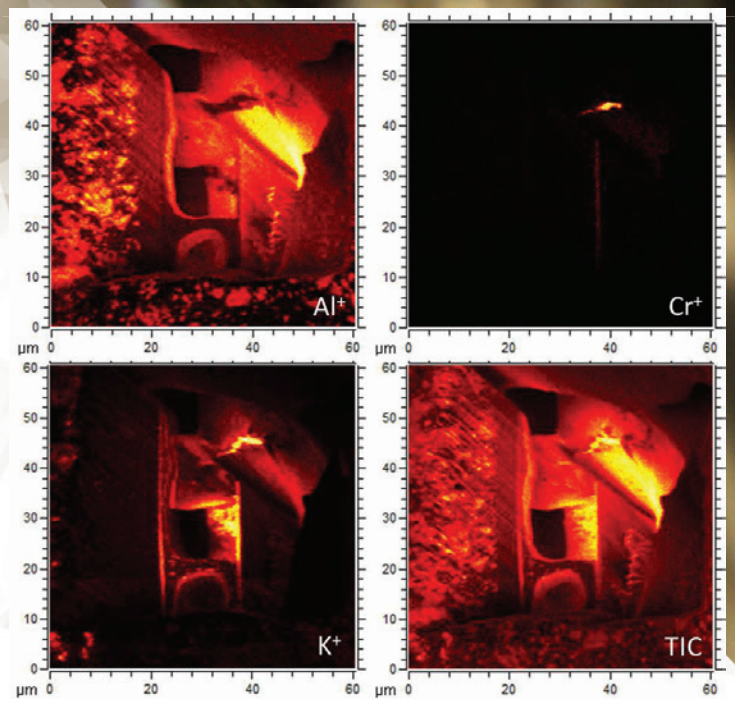

Photo credit: Dr. Jonathan Dilger and R. "Bud" Hoerter, and edited by Lisa Bailon

Naval Surface Warfare Center (NSWC) Crane Division

Specializing in harnessing the power of technology for the warfighter, NSWC Crane is a recognized leader in the areas of special missions, strategic missions, and electronic warfare. Services include acquisition engineering, in-service engineering and technical support for sensors, electronics, electronic warfare and special warfare weapons. NSWC Crane works to apply component and system-level product and industrial engineering to surface sensors, strategic systems, special warfare devices and electronic warfare/information operations systems.

www.navsea.navy.mil/Home/Warfare-Centers/NSWC-Crane

September

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3	4 Labor Day	5	6	7	8	9
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Protecting Device Ports From Intrusion

National Security Agency (NSA) inventor Gary Mosholder installs server port protection devices that guard against cyber crime. Network breaches and data loss are cyber threats that impact everyone, and not everyone knows that something as common as an external device port can be one of the biggest cyber vulnerabilities. The NSA Technology Transfer Program activated multiple Patent License Agreements with Padjack, Inc., to commercialize the port protection devices. Consumers now have access to these products that provide a layer of cyber security—at the physical level.

Photo credit: Joaquina Braithwaite

NATIONAL SECURITY AGENCY
TECHNOLOGY TRANSFER PROGRAM
Office of Research & Technology Applications

NSA Technology Transfer Program

NSA's portfolio of patented big data, cyber, internet of things, and mobility technologies can be leveraged by companies of any size to build or enhance their businesses. The NSA Technology Transfer Program, located within the agency's Research Directorate, pursues the widest possible application of agency technology to advance science, accelerate mission solutions, promote technology commercialization, and benefit the U.S. economy.

www.nsa.gov/techtransfer

October

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1	2	3	4	5	6	7
8	9 Columbus Day	10	11	12	13	14
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September 2017

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November 2017

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Encapsulation of Tetracene Crystals to Enhance the Efficiency of PV Cells

NREL scientist Justin Johnson holds tetracene crystals he grew in the PV Module Encapsulation Research Lab in the Solar Energy Research Facility. He is working with tetracene crystals to enhance the efficiency of PV cells. A new singlet-mediated transport mechanism for triplets leads to an enhancement in effective triplet exciton diffusion of more than one order of magnitude on picosecond to nanosecond timescales. These results establish that there are optimal energetics of singlet and triplet excitons that benefit both singlet fission and exciton diffusion.

Photo credit: Dennis Schroeder, NREL

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

National Renewable Energy Laboratory

The National Renewable Energy Laboratory (NREL) is the U.S. Department of Energy's primary national laboratory for renewable energy and energy efficiency research. From scientific discovery to accelerating market adoption, NREL deploys its deep technical expertise and unmatched breadth of capabilities to drive the transformation of our nation's energy resources and systems.

www.nrel.gov

November

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5	6	7	8	9	10	11 Veterans Day
12	13	14	15	16	17	18
19	20	21	22	23 Thanksgiving Day	24	25
26	27	28	29	30		

Production of Anti-HIV Microbicide in Soya Beans

Genetically modified soya beans provide a scalable, low-cost method of producing microbicides that prevent AIDS, a technique sustainable for resource-poor countries where AIDS is spreading rapidly. The NCI Molecular Targets Laboratory, working with the Frederick National Laboratory, and the Brazilian Agricultural Research Corporation partnered to demonstrate an inexpensive and safe HIV infection treatment approach suitable for resource-poor areas. Researchers have demonstrated that soya bean seeds provide an alternative means of producing Cyanovirin-N (CV-N), a protein capable of permanently deactivating strains of HIV and preventing infection.

Photo credit: Barry O'Keefe, Ph.D., Molecular Targets Laboratory, Center for Cancer Research, NCI, and Elibio Rech, Embrapa Genetic Resources and Biotechnology and Fabiano M.D., Bastos, EMBRAPA Cerrados, Brasil

NATIONAL CANCER INSTITUTE

National Cancer Institute (NCI)

The Molecular Targets Laboratory at the National Cancer Institute focuses on identification and validation of potential cancer targets through an interdisciplinary, collaborative approach. This includes exploiting NCI's existing chemical and biodiversity repositories, acquiring natural products, and identifying synthetic compounds that may serve as lead compounds for clinical development. The NCI is the federal government's principal agency for cancer research, and supports programs such as HIV research and discovery.

www.cancer.gov

December

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November 2017 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	January 2018 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31				1	2
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24 31	25 Christmas Day	26	27	28	29	30

Polyelectrolyte Enabled Liftoff (PEEL)

PEEL is a robust, scalable method of fabricating freestanding polymer films that are larger, stronger and thinner than conventionally produced films. PEEL is used for the daily fabrication of membranes as thin as 30 nanometers that serve as compliant, load-bearing elements known as “tents” for suspending target capsules inside National Ignition Facility (NIF) hohlraums - http://go.usa.gov/xkYZ3.
The PEEL process is easily scalable in size and manufacturing quantity. PEEL may be used as an industrially scalable membrane fabrication process for filtration, sensing, catalysis, or biomedical applications. PEEL has been named a 2016 R&D 100 finalist. Take a virtual tour of NIF at https://youtu.be/j_snOFH2K7A.

Photo credit: Michael Stadermann, LLNL

Lawrence Livermore National Laboratory

Lawrence Livermore National Laboratory (LLNL)

Lawrence Livermore National Laboratory has a mission of strengthening the United States’ security by developing and applying world-class science, technology and engineering that enhances the nation’s defense; reduces the global threat from terrorism and weapons of mass destruction; and responds with vision, quality, integrity and technical excellence to scientific issues of national importance.

www.llnl.gov

January 2018

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	1 New Year's Day	2	3	4	5	6
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14	15 Martin Luther King, Jr. Day	16	17	18	19	20
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December 2017

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February 2018

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Our Federal Labs At Work

Langmuir Probe ▼

Langmuir probes like this one are basic tools for gauging the state of the plasma that fuels fusion experiments at the Princeton Plasma Physics Laboratory (PPPL). Researchers insert an electrode from the probe into the edge of the plasma to measure the temperature and density of the electrons that swirl inside. Data from the probe, which is named for pioneering plasma physicist and Nobel laureate Irving Langmuir, provides essential information about the electrons and the electric field inside the plasma.

PPPL
PRINCETON PLASMA PHYSICS LABORATORY

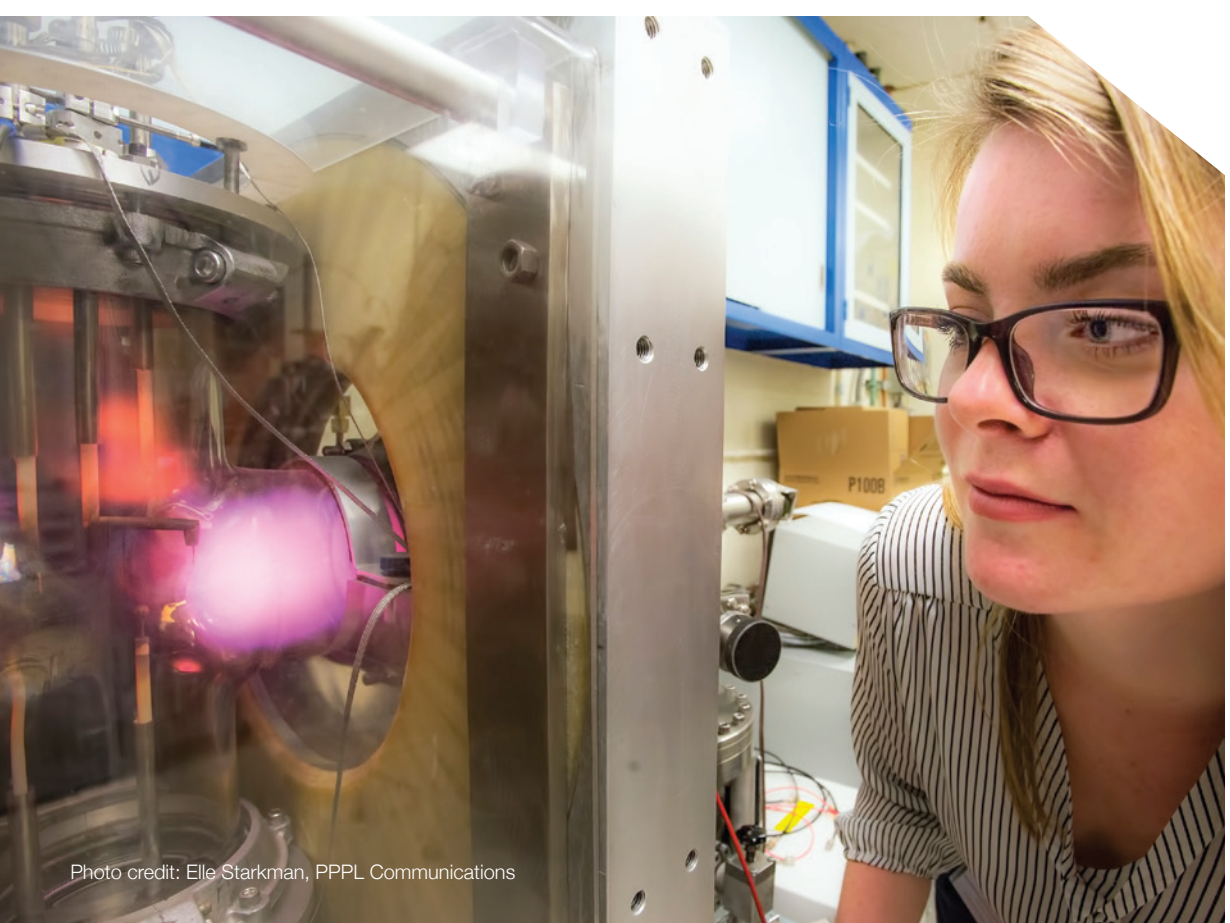

Photo credit: Elle Starkman, PPPL Communications

Smart-Home-in-the-Loop Development ▶

NREL engineers Bethany Sparns and Dheepak Krishnamurthy, and Science Undergraduate Lab Internship intern Paul Vaynshenk work on a Smart-Home-in-the-Loop experiment in the Systems Performance Lab at the Energy Systems Integration Facility. The study connects electric vehicles and smart appliances to a grid in the lab to study the dynamics of how they interact to degrees of "smartness" that allow the devices to potentially communicate with the user, the utility, and even with one another.

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Photo credit: Dennis Schroeder, NREL

Electron Tomography Imaging of Nanotube 3D Structure ▼

Researchers from NIST's Center for Nanoscale Science and Technology (CNST), MIT and the University of Maryland have developed image acquisition and processing techniques to map the 3D structure of carbon nanotubes inside a composite material such as an epoxy resin. This colorized version of carbon nanotube bundles was originally imaged with electron tomography. The colors, derived from an image-processing algorithm, are determined by the sizes of the bundles and clearly define their shape and network structure.

NIST

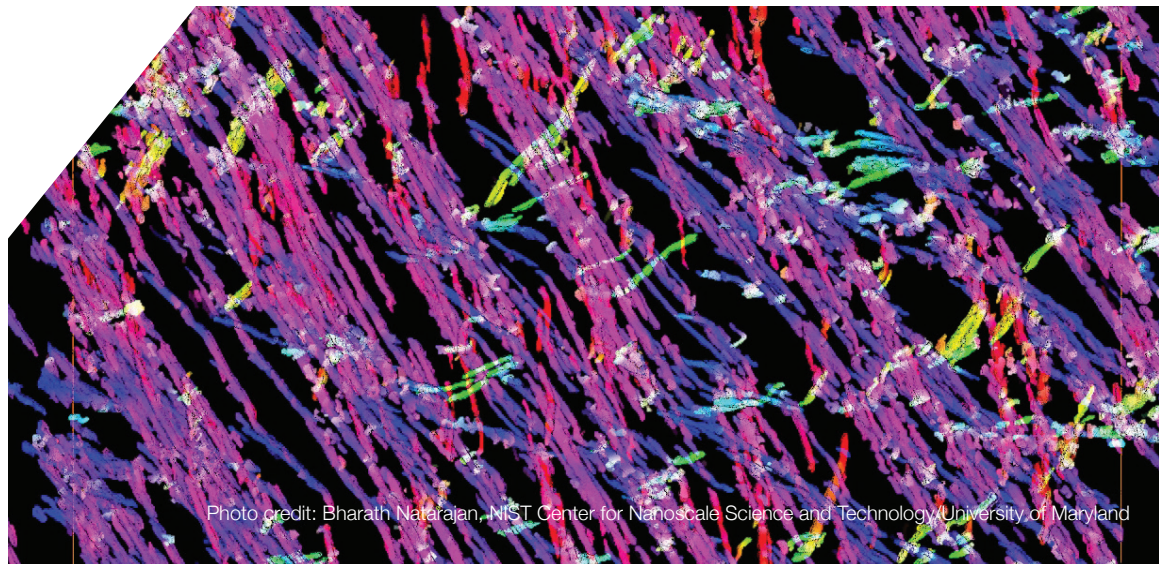

Photo credit: Bharath Natarajan, NIST Center for Nanoscale Science and Technology/University of Maryland

Our Federal Labs At Work

Formulas Effectively Tackle a Growing Number of Toxic Threats

The patented Sandia Decontamination Technology is a safe, effective, easy-to-use disinfectant that handles biological and chemical threats, including emerging infectious diseases, clandestine drug labs, mold, fungi, viruses, and bacteria. It is a two- or three-part system consisting of hydrogen peroxide with surfactants and activators. Originally used by the military and first responders, it has found a growing number of applications in industrial, institutional, and military markets. This photo shows the cleanup of a contaminated home where methamphetamine was illegally manufactured.

Sandia National Laboratories

Photo credit: EFT Holdings

Black Hawk Aircrew Trainer

The Black Hawk Aircrew Trainer (BAT) is a highly immersive, home-station flight training device, composed of a state-of-the-art collimated visual system, a complete UH-60M cockpit, an instructor-operator station and a vertically expandable container. BAT is designed modularly to maximize flexibility for future growth and includes a vertically expanding container that is both a shipping container for the device and an environmentally controlled building that will house the device after it is delivered.

AMRDEC

Photo credit: RDECOM

Documenting Change in Northwest Alaska and Projecting Its Effects on Wildlife Habitat

The effects of climate change in northwest Alaska are already evident: Thawing permafrost is causing lakes to drain, and wildfires are becoming more frequent as forests become drier, leading to shifts in vegetation types. These changes affect the region's wildlife and the people who depend on them for subsistence. A scientist with the Pacific Northwest Research Station is leading the multi-agency Wildlife Potential Habitat Forecasting (WildCast) Project, documenting current conditions with aerial photos and projecting change in habitat for 200 species of mammals and birds over the next century.

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

Photo credit: Bruce Marcot, U.S. Forest Service

Our Federal Labs At Work

FAA's Full-Scale Aircraft Structural Test Evaluation and Research (FASTER) Facility ▶

The FAA's FASTER is a state-of-the-art laboratory that performs structural testing of current and next-generation airframe fuselage structures. The facility is used in partnership with other organizations, including NASA and Boeing, to address areas of safety and structural integrity. Data from the test efforts is used to calibrate and verify methods to evaluate fatigue damage and residual strength. Recent and future efforts focus on assessing bonded repair and emerging metallic structure technologies.

Photo credit: Laurie Zaleski and Michael Gross

Photo credit: Volpe

◀ Truck Side Guard

Truck side guards are safety devices designed to prevent pedestrians and bicyclists from being swept under and killed by a large truck in side-impact collisions, but they can also reduce aerodynamic drag, eliminating 4 to 7 percent of fuel consumption and greenhouse gas emissions. Drawing on research across the safety and environmental disciplines, Volpe proposed that dual-purpose aerodynamic side guards could replicate the significant fatality reduction documented in the UK (61% for bicyclists, and 20% for pedestrians). Volpe partnered with New York City (pictured) and other fleet agencies nationwide to develop technical specifications, scope vendors, and test large-scale deployments.

Volpe
The National Transportation Systems Center

NDX-1 Spacesuit ▼

University of North Dakota graduate researcher Travis Nelson, wearing an NDX-1 spacesuit, practices scooping up objects and placing them into containers inside the SwampWorks regolith bin at NASA's Kennedy Space Center in Florida. The university team is analyzing the prototype suit's ability to protect astronauts while allowing them the flexibility to dig samples and perform other tasks in regolith, a fine, powdery soil similar to that found on Mars.

Photo credit: Dimitri Gerondidakis, NASA

Our Federal Labs At Work

Microscopic Analysis ▶

Susan Taylor, Ph.D., research scientist at the U.S. Army Cold Regions Research and Engineering Laboratory, works with the Dartmouth College Electron Microscope Facility to examine extraterrestrial material from comet Wild 2 collected by NASA's Stardust mission. NASA and the National Science Foundation (NSF) are working with the Engineer Research and Development Center (ERDC) to collect extraterrestrial materials (cosmic dust) from the clean Antarctic air. ERDC's Taylor developed the first classification system for micrometeorites (a subset of cosmic dust) and found that particle textures are linked to atmospheric entry heating. She also discovered the first micrometeorites from the asteroid Vesta.

ERDC
Engineer Research & Development Center

Photo credit: Dartmouth College

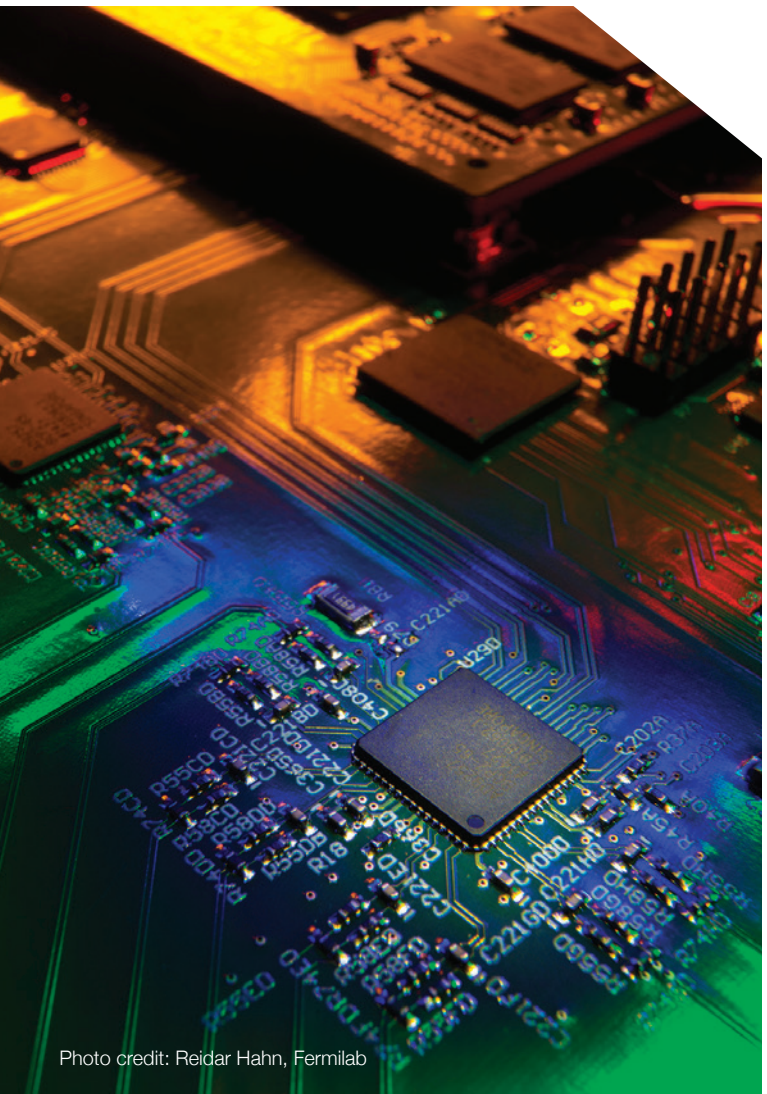

Photo credit: Reidar Hahn, Fermilab

◀ Low-Level RF Magnetron Controlled - System on Chip Multi-field Cavity Controller - VXI Board

Fermilab's novel injection-locked magnetron technology provides excellent phase and amplitude control in superconducting radio-frequency (SRF) cavities, the technology of choice to generate powerful particle beams. Fermilab's technology can reduce the cost of RF power for compact SRF accelerators by a factor of 5 while at the same time achieving efficiencies in excess of 80%, in turn yielding substantial size, weight, and cost reductions in both power and cooling systems. This, along with other Fermilab innovations, allows powerful particle accelerators to be small, light, mobile, and simple enough for industrial applications.

Fermilab

Compact Vibration Damper ▼

The compact vibration damper provides superior performance when compared with conventional devices. Because of its design, it is also easily tunable, scalable, and lightweight. Beyond aerospace applications, the system has uses in other structures where reducing vibrations is vital, such as wind turbines, skyscrapers, and smokestacks.

NASA

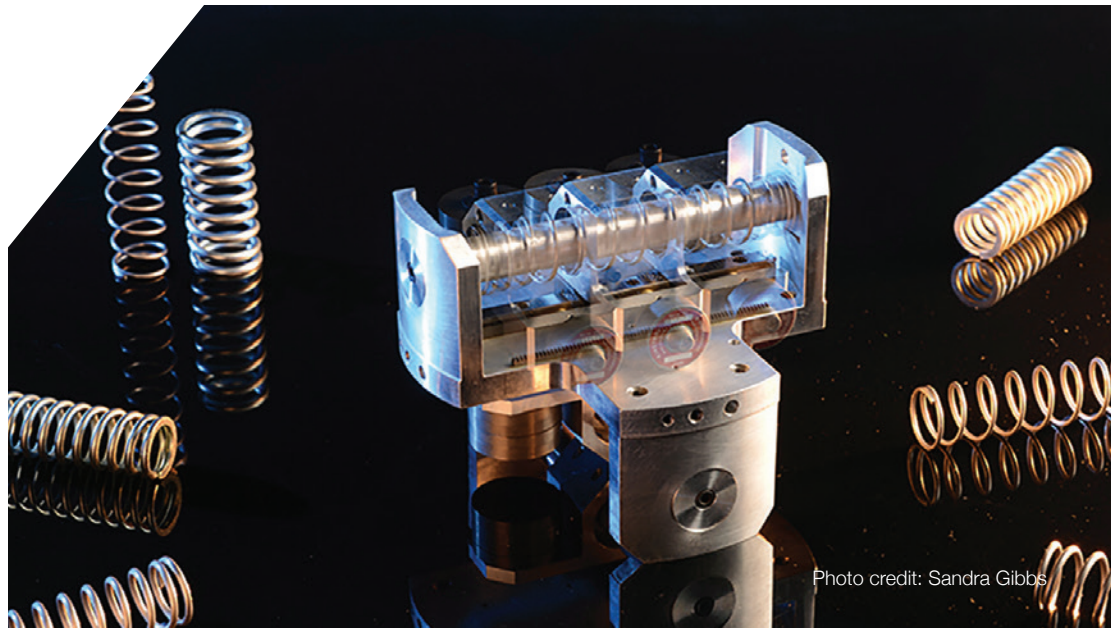

Photo credit: Sandra Gibbs

Our Federal Labs At Work

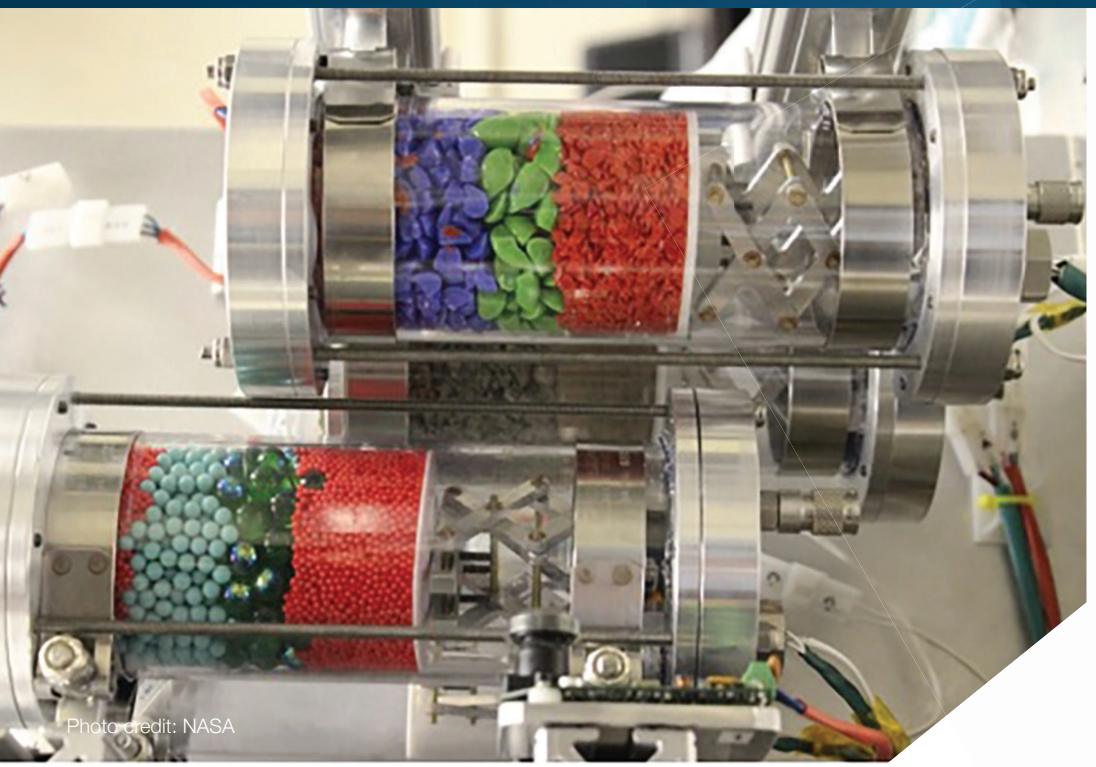

Photo credit: NASA

Strata-1

Strata-1 is a study of asteroid regolith onboard the International Space Station (ISS). Strata-1 is comprised of four clear tubes, each filled with a different regolith simulant chosen to include a range of complexity, including glass spheres, a tube of glass fragments, more complex crushed/sieved meteorite material, and a carbonaceous chondrite simulant. Strata-1's goal is to provide answers about how to interact with regolith, such as how to anchor a spacecraft to the surface of an asteroid. Strata-1 is a Class 1E payload from Johnson Space Center and went from concept to flight-ready in just 10 months.

Propagated Influenza Virus for Pre-pandemic Vaccine Research

A Centers for Disease Control (CDC) scientist titrates influenza (flu) virus that has been propagated in chicken eggs with embryos. The propagated virus was used to identify the infectivity levels of a pre-pandemic candidate vaccine virus generated by the team. CDC has active Cooperative Research and Development Agreements (CRADAs), Research Collaboration Agreements (RCAs), and Material Transfer Agreements (MTAs) with several partners for important influenza vaccine research.

Photo credit: James Gathany, CDC

FLC

Federal Laboratory Consortium for Technology Transfer

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