

NEWSLINE YEAR IN REVIEW

2021

LAWRENCE LIVERMORE NATIONAL LABORATORY



YELLOW LINKS ARE ACCESSIBLE ON THE LAB'S INTERNAL NETWORK ONLY.
BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



AN EXCEPTIONAL YEAR FOR LAB, DESPITE PANDEMIC

While the impacts of the COVID-19 pandemic continued to be felt, 2021 marked an exceptional year for the Laboratory in science, technology and operations.

A historic experiment at the National Ignition Facility put researchers on the threshold of fusion ignition, producing a yield more than 8 times greater than before and opening access to an entirely new experimental regime.

The W80-4 Life Extension and W87-1 Modification programs continued to make important progress, and LLNL, in partnership with Kansas City National Security Campus, brought online a new polymer production enclave to enable rapid development of design and production processes of polymer parts for modernization programs.

The Lab delivered eight prototype pulsed-power modules for testing to Los Alamos National Laboratory, marking

completion of a key milestone in a multi-lab effort to develop Scorpius, a next-generation particle accelerator for X-ray imaging.

LLNL took part in NASA's first-ever planetary defense test, which will deliberately collide a spacecraft into an asteroid called Dimorphos. The Double Asteroid Redirection Test (DART) will examine technologies that will prevent an impact of Earth by a hazardous asteroid. To assist in the exploration of space from Earth, LLNL engineers delivered final optical components for world's newest telescope, the Vera C. Rubin Observatory.

Combining hybrid polymer materials with microfabrication and 3D printing, the Lab developed an ultra-compact, lightweight and minimally invasive optoelectronic neural implant that could be used for long-term studies of brain activity.

LLNL joined the international Human Vaccines Project, bringing Lab expertise and computing resources to the consortium to aid development of a universal coronavirus vaccine and improve understanding of immune response.

Leaders from the National Nuclear Security Administration, Congressional representatives and local elected officials gathered at LLNL to celebrate an expansion to the Livermore Valley Open Campus. Significant progress was made on additional infrastructure projects, including the ECFM project to support the delivery of El Capitan, the first exascale computer for national security applications, and the new Emergency Operations Center.

LLNL scientists and engineers were awarded three R&D 100 awards, often dubbed the "Oscars of invention" and three national technology transfer awards from

the Federal Laboratory Consortium. In addition, Lab employees from 10 project teams earned Department of Energy Secretary Achievement Awards.

Secretary of Energy Jennifer M. Granholm virtually visited LLNL, where she met with leading scientists and engineers, toured lab facilities and learned about key research efforts.

LLNL was honored with a Glassdoor Employees' Choice Award for the third consecutive year, recognizing the Best Places to Work in 2021 and by the American Indian Science and Engineering Society *Winds of Change* magazine as one of the Top 50 STEM Workplaces in 2021.

Lab employees, along with Lawrence Livermore National Security, LLC, donated more than \$3.6 million to charitable organizations via the annual employee giving program, the Helping Others More Effectively (HOME) Campaign. Donations will benefit more than 1,500 community and nonprofit agencies in the Tri-Valley, Greater Bay Area, San Joaquin County and beyond, a much-needed boost to organizations that have felt the effects of the global pandemic.



Workplace transition also was a hallmark of 2021, as the Laboratory began its "Return to New Normal." A key part of this transition was the move to LLNL's new hybrid workplace, affording flexibility to employees while continuing to deliver on important mission commitments.

This is just a very small sampling of the Lab's accomplishments in 2021. For a more comprehensive look back at the year, please see the month-by-month review of 2021.

INSIDE YEAR IN REVIEW

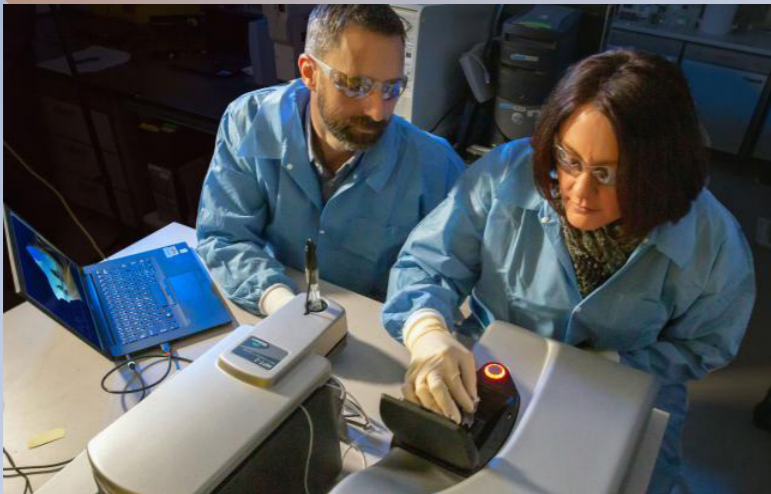
2 INTRODUCTION

<u>3</u> JANUARY	<u>18</u> JULY
<u>5</u> FEBRUARY	<u>19</u> AUGUST
<u>7</u> MARCH	<u>20</u> SEPTEMBER
<u>10</u> APRIL	<u>22</u> OCTOBER
<u>13</u> MAY	<u>24</u> NOVEMBER
<u>15</u> JUNE	<u>27</u> DECEMBER

 [YELLOW LINKS](#) ARE ACCESSIBLE ON THE LAB'S INTERNAL NETWORK ONLY.
 [BLUE LINKS](#) ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.

YEAR in REVIEW

A MONTH-BY-MONTH RECAP



LLNL researchers Nick Fischer and Amy Rasley characterize nanolipoprotein particle vaccine formulations using a dynamic light-scattering instrument. Detailed characterization of the nanoparticles provides an important quality-control metric for vaccine development.

JANUARY

SCIENCE & TECHNOLOGY

New research by scientists from Nanjing University, LLNL and Texas A&M University concludes the planet is committed to global warming in excess of 2 degrees Celsius (3.6 degrees Fahrenheit) just from greenhouse gases that have already been added to the atmosphere.

[Read more](#)

LLNL researchers develop an ultra-compact, lightweight and minimally invasive optoelectronic neural implant that could be used for long-term studies of brain activity. The new implantable devices are built upon a new platform LLNL researchers are calling POEMS (Polymeric Opto-Electro-Mechanical Systems).

[Read more](#)

LLNL researchers develop an X-ray source that can diagnose temperatures in experiments that probe conditions like those at the very center of planets. The new source will be used to perform extended X-ray absorption fine-structure experiments at the National Ignition Facility.

[Read more](#)

Lawrence Livermore scientists discover that carbon nanotube membrane pores could enable ultra-rapid dialysis processes that would greatly reduce treatment time for hemodialysis patients.

[Read more](#)

Lawrence Livermore scientists reconstruct the original solar system formation locations by studying the isotopic compositions of different groups of meteorites that all derived from the asteroid belt between Mars and Jupiter.

[Read more](#)

ConserV Bioscience Limited (CBL) and LLNL collaborate on the development of a broad-spectrum or “universal” coronavirus vaccine. This collaboration brings together CBL’s expertise in identifying antigens and LLNL’s nanolipoprotein delivery system.

[Read more](#)

Scientists from Lawrence Livermore, the Scripps Institution of Oceanography and international collaborators show that an improved representation of drizzle rates leads to more pollution in the atmosphere.

[Read more](#)

By placing a shock-compressed sample of zirconium under ultrafast time-resolved X-rays, LLNL scientists and collaborators see an intermediate phase along the transition between two solid phases. Theory has predicted the existence of an intermediate step in this phase transition, but it has not been observed until now.

[Read more](#)

NASA selects LLNL and Goddard Space Flight Center to serve as lead institutions for the Pandora scientific mission that will study 20 stars and their 39 exoplanets.

[Read more](#)

Lawrence Livermore scientists conduct the first-ever shot to study a high explosive sample at the National Ignition Facility, the world’s most energetic laser. The results from the shot include novel data that will help LLNL researchers unlock the mysteries of high-explosive chemistry.

[Read more](#)

Under the Discovery Science program, which allows academic scientists access to LLNL’s flagship National Ignition Facility, an international team of researchers led by the Lab and the University of Oxford successfully measure carbon at pressures reaching 2,000 GPa (five times the pressure in Earth’s core).

[Read more](#)



Kim Budil is named director of Lawrence Livermore National Laboratory. Budil began her new role on March 2.

“Kim Budil’s passion and commitment to the Lab’s mission and people and her ability to strategically manage the breadth of Livermore’s science and technology capabilities and operations will serve the Lab, its people and the nation well.”

– Charlene Zettel, chair of LLNS, on the selection of Kim Budil as the new Lab director

PEOPLE

LLNL employees, participating in 10 project teams, receive the Department of Energy’s Secretary Achievement Awards.

[Read more](#)

Charlene Zettel, chair of Lawrence Livermore National Security, LLC, which manages the Laboratory for the Department of Energy’s National Nuclear Security Administration, announces the selection of Kim Budil as LLNL’s new director. Budil is the 13th leader of the Laboratory since it was established in 1952 and its first woman director.

[Read more](#)

Pat Falcone, LLNL’s deputy director for Science and Technology, is a featured panelist in “Paving the Way: A Virtual Conversation,” a special livestream event sponsored by the Quest Science Center.

[Read more](#)

The 2021 IEEE Winter Conference on Applications of Computer Vision announces that a paper co-authored by LLNL computer scientist Rushil Anirudh received the conference’s Best Paper Honorable Mention award based on its potential impact to the field.

[Read more](#)

As an experimentalist at LLNL developing diagnostics and experimental techniques in the field of dynamic high-pressure physics, Peter Celliers leads a national topical group of the American Physical Society (APS). Celliers is elected to the executive committee as vice-chair of the APS Topical Group on Shock Compression of Condensed Matter.

[Read more](#)

OPERATIONS

With a focus on increasing joint research efforts between LLNL and universities, the Lab’s Weapon Physics and Design Academic Collaboration Team (ACT) University Program presents the year’s ACT-UP awards.

[Read more](#)

For the third consecutive year, LLNL is honored with a Glassdoor Employees’ Choice Award, recognizing the Best Places to Work in 2021.

[Read more](#)

In a continuing effort to explore ways to better track COVID-19 and strengthen the Lab’s ability to ensure a safe workplace, LLNL scientists conduct a multi-phase environmental sampling research study. The research is designed to inform discussions about the possible future utility of environmental sampling as an added tool.

[Read more](#)

The state of California approves LLNL’s Health Services Department to serve as a provider of the COVID-19 vaccine. The Laboratory develops a vaccine dispensing plan to ensure its approach is consistent with California and Alameda County guidance on prioritization.

[Read more](#)

Due to the overwhelming success of the Brighter Holidays program, the Livermore Laboratory Employee Services Association continues the giving and volunteer opportunities all throughout the year through the Brighter Days campaign.

[Read more](#)



YELLOW LINKS ARE ACCESSIBLE ON THE LAB’S INTERNAL NETWORK ONLY.

BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



An artistic rendering of the interior structure of Earth (left) compared to a large rocky exoplanet (right). Image by John Jett and Federica Coppari/LLNL.

“It is mind-boggling to think that our laboratory experiments can peer into the interior structure of planets so far away with unprecedented resolution and contribute to a deeper understanding of the universe.”

– Federica Coppari, LLNL physicist

FEBRUARY

SCIENCE & TECHNOLOGY

LLNL’s Center for Global Security Research publishes the fourth book in its Strategic Latency series: “Strategic Latency Unleashed: The Role of Technology in a Revisionist Global Order and the Implications for Special Operations Forces.” The recent volume examines the implications of emerging technologies from the perspective of America’s special operations forces.

[Read more](#)

LLNL scientists develop a new method for 3D printing living microbes in controlled patterns, expanding the potential for using engineered bacteria to recover rare-earth metals, clean wastewater, detect uranium and more.

[Read more](#)

Researchers from LLNL take important steps to show that thermal conduction is important and measurable at high pressure and temperature conditions during shock compression experiments.

[Read more](#)

In an effort to better understand how materials deform under extreme conditions, researchers at LLNL develop a new experimental method for probing large-strain and high-rate material strength.

[Read more](#)

Lawrence Livermore computer scientists develop a new deep-learning approach to design emulators for scientific processes that is more accurate and efficient than existing methods.

[Read more](#)

Led by LLNL, a team of researchers aims to unlock some of the secrets of extrasolar planets by understanding the properties of iron oxide — one of the constituents of Earth’s

mantle — at the extreme pressures and temperatures that are likely found in the interiors of these large rocky planets.

[Read more](#)

Kirsten Howley doesn’t have an orange jumpsuit at hand, but her job is serious business. She and her team of planetary defenders specialize in how we might deflect an asteroid like Bennu that poses a threat to Earth.

[Read more](#)

In the wake of the massive Aug. 4, 2020 explosion that rocked Lebanon’s capital of Beirut, new research by LLNL and Los Alamos National Laboratory sheds light on its unusual ignition process and scientists’ understanding of explosives to make them safer for handling, storage and transportation.

[Read more](#)

Lab personnel subject notional bomb components handled by LLNL volunteers to contained-precision explosions to determine whether makers of a terrorist bomb can be identified by skin proteins left on bomb components.

[Read more](#)

One year after publishing the groundbreaking “Getting to Neutral: Options for Negative Carbon Emissions in California,” LLNL becomes a trusted adviser in the discussion of how to remove carbon dioxide from the air. In the report, LLNL scientists identify a robust suite of technologies to help California clear the last hurdle and become carbon neutral — and ultimately carbon negative — by 2045.

[Read more](#)

LLNL researchers Babak Sadigh, Luis Zepeda-Ruiz and Jon Belof report on a new mechanism of solidification in copper that provides an atomistic view of Nobel prize-winning physical chemist Friedrich Wilhelm Ostwald’s step rule and alters the fundamental understanding of nucleation at high pressure.

[Read more](#)



YELLOW LINKS ARE ACCESSIBLE ON THE LAB’S INTERNAL NETWORK ONLY.

BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



LLNL physicist Matthias Frank measures the movement of DNATrax surrogate particles in a test chamber.

“By understanding the airborne disease transmission, we hope to offer science-based information that people can use to protect themselves and others.”

– Atmospheric scientist Michael Dillon, who works with LLNL physicist Matthias Frank

LLNL scientists leverage their extensive experience studying the movement of airborne hazards to better understand the movement of virus-like particles through the air and to identify effective countermeasures.

[Read more](#)

In new experiments, a Lawrence Livermore scientist and international collaborators find that outflow/magnetic field misalignment is a plausible key process regulating jet formation in astronomical phenomena.

[Read more](#)

Researchers from LLNL conduct work to gain a better understanding about why even percent-level deviations from perfect spherical symmetry can lead to significant distortions of the implosion and ultimately degrade fusion performance.

[Read more](#)

PEOPLE

Director Bill Goldstein announces the selection of Anup Singh as the new LLNL associate director for Engineering.

[Read more](#)

LLNL’s Charles and Debbie Ball receive the Office of the Secretary of Defense (OSD) Medal for Exceptional Public Service while on assignment with OSD.

[Read more](#)

LLNL’s Nils Carlson receives the Office of the Director of National Intelligence (ODNI) award for exceptional service while on assignment with ODNI.

[Read more](#)

Craig Tarver, a LLNL retiree and consultant to the Lab’s Energetic Materials Center, is honored with the American Physical Society’s 2021 George Duvall Shock Compression Science Award for “theoretical advancement

of the understanding of shock-driven reactions and detonation in condensed phase explosives.”

[Read more](#)

Nearly a year into piloting a major scientific institution through one of the most taxing and disruptive global events in modern history, outgoing Lab Director Bill Goldstein is ready for a vacation. As the 12th director in the Lab’s history, Goldstein faced myriad challenges in his almost seven years at the helm. But nothing could’ve prepared him for COVID-19.

[Read more](#)

OPERATIONS

LLNL’s popular lecture series, “Science on Saturday,” goes virtual in 2021 with the theme “Combating COVID-19.” Each Saturday features a different lecture presented by leading LLNL researchers joined by a master high school science teacher.

[Read more](#)

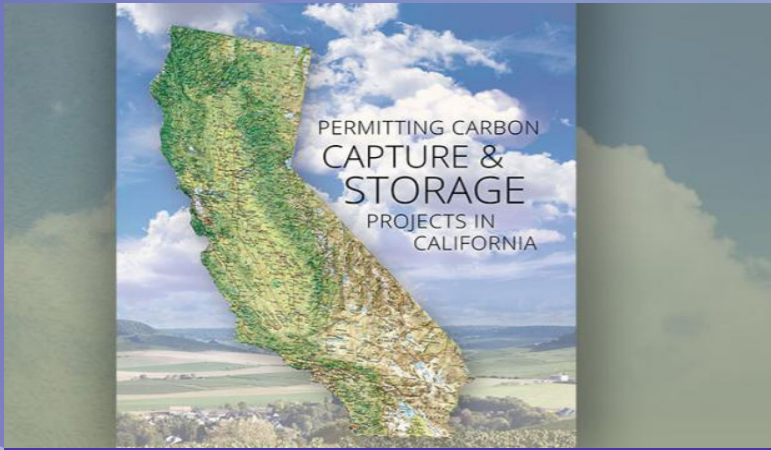
LLNL researchers launch a new Space Science Institute (SSI), intended to boost cross-discipline collaboration and discovery. SSI will build on Livermore strengths in astrophysics, earth science, nuclear science and engineering.

[Read more](#)

In honor of Black History Month, six members of the African American Body of Laboratory Employees resource group channel their inner actor and bring characters to life in a special virtual live Readers Theatre reading of the graphic novel trilogy “March” by the late U.S. Rep. John Lewis.

[Read more](#)

A University of California Office of the President grant program brings six graduate students to Livermore this year. The UC-National Lab In-Residence Graduate



A Lab report outlines updates to state's regulations for carbon capture, storage in effort to achieve neutrality.

“California could obtain faster and larger carbon emission reduction removal while maintaining the robustness and rigor of its environmental review and permitting regime through some simple interventions to existing processes and structures.”

– LLNL researcher George Peridas

Fellowships fund the Ph.D. candidates to work with mentors at the Lab.

[Read more](#)

Pre-hire employees and LLNL administrators alike offer rave reviews for the new Employee Onboarding Center that was piloted by select organizations last fall.

[Read more](#)

The Foreign Travel Office, in partnership with Livermore Information Technology, launches a new version of the Foreign Travel System.

[Read more](#)

MARCH

SCIENCE AND TECHNOLOGY

A new Lab report outlines updates to the state's regulations for carbon capture and storage in the effort to achieve neutrality. To reach economy-wide carbon neutrality by 2045 or earlier, California will likely have to capture, transport and geologically store tens of millions of tons of carbon dioxide per year from large sources and the atmosphere.

[Read more](#)

Computer scientists at LLNL and IBM Research develop a “self-training” deep-learning approach that addresses common challenges in the adoption of artificial intelligence for disease diagnosis. The team wins a Best Paper award for Computer-Aided Diagnosis for the work at the recent SPIE Medical Imaging Conference.

[Read more](#)

George Peridas, LLNL director of carbon management partnerships, and Lab staff scientist Briana Schmidt discuss results from a new report titled “Permitting Carbon Capture and Storage in California,” which examines the state's

carbon-capture regulatory framework and offers options for government and project developers to enable robust, transparent and efficient project permitting in line with the state's goal to reach carbon neutrality by 2045 or earlier.

[Read more](#)

Using targets with micro-structures on the laser interface, an LLNL team shoots a high-intensity laser through them and sees a 100 percent increase in the amount of laboratory-created antimatter (also known as positrons).

[Read more](#)

A joint test assembly (JTA) designed by Lawrence Livermore and Sandia national laboratories is onboard an unarmed Minuteman III intercontinental ballistic missile, and successfully launched from Vandenberg Air Force Base in California.

[Read more](#)

LLNL researchers show how applying pressure to a specific thermoelectric material, TiNiSn, increases its efficiency and leads to a structural phase transition. The research shows that pressure and temperature may enhance the properties and efficiency of thermoelectric materials for better potential use in applications such as waste heat recovery, radio-isotope thermoelectric generators (as used by NASA on space missions) and cooling in computer circuitry.

[Read more](#)

An influential Department of Energy advisory committee recommends that the nation move aggressively toward the deployment of fusion energy, including investments in technology and equipment to support one of the core missions of LLNL's National Ignition Facility and lay the groundwork for the development of inertial fusion energy.

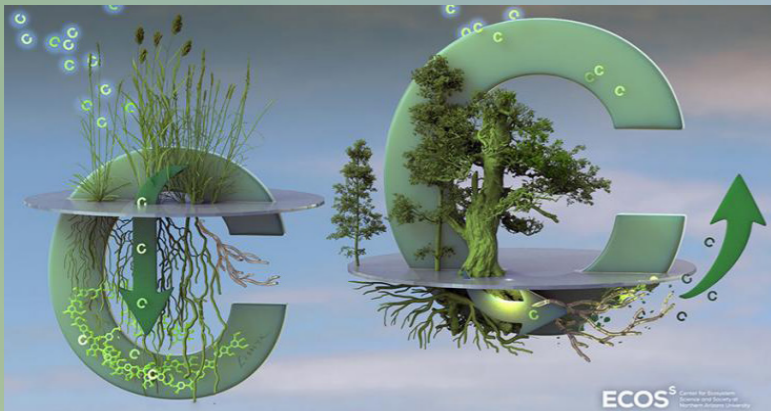
[Read more](#)

Lab scientists, California policymakers and industry leaders come together to discuss the reality of getting to carbon neutral during a forum titled “Carbon Capture



YELLOW LINKS ARE ACCESSIBLE ON THE LAB'S INTERNAL NETWORK ONLY.

BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



Elevated carbon dioxide (eCO₂) has opposing effects on plant biomass and soil carbon, and these effects contrast between forests and grasslands. Image by Victor O. Leshyk/Center for Ecosystem Science and Society, Northern Arizona University.

“The variations in soil carbon accrual under elevated atmospheric CO₂ remain poorly understood and this contributes to uncertainties in climate projections.”

– César Terrer, LLNL Lawrence Fellow

and Sequestration in California: Regional Insights and Community Attitudes.”

[Read more](#)

An international group of researchers, including a scientist from LLNL, analyze sediments at the base of the Camp Century ice core (1.4 kilometers deep) collected in 1966 and determine that Greenland wasn't always covered in ice.

[Read more](#)

Research conducted on LLNL's supercomputer Quartz, through a collaboration between LLNL and Purdue University reveals a missing aspect of the physics of hotspots in TATB and other explosives.

[Read more](#)

LLNL computer scientists develop a new framework and an accompanying visualization tool that leverages deep reinforcement learning for symbolic regression problems, outperforming baseline methods on benchmark problems.

[Read more](#)

New Lab research shows that naturally occurring climate variations help to explain a long-standing difference between climate models and satellite observations of global warming.

[Read more](#)

An international team led by LLNL scientists synthesizes 108 elevated carbon dioxide experiments in various ecosystems to find out how much carbon is absorbed by plants and soil.

[Read more](#)

LLNL scientists publish the results of a three-week experimental campaign at the Lab's Jupiter Laser Facility to test the performance of laser-heated additive manufactured foams. The project helps support two major Laboratory

focus areas, including helping to advance additive manufacturing and enabling improvements in performance of hohlraums.

[Read more](#)

For the first time, Lab researchers isolate, in a controlled laboratory setting, the effects of the plasma geometry in its X-ray emission spectrum — the energy distribution of the radiation the plasmas emit.

[Read more](#)

In an effort to improve cloud representations in climate models, researchers from Lawrence Livermore and Argonne national laboratories compare them to observations from the Department of Energy Atmospheric Radiation Measurement program. The team combines measurements from three different instruments to measure properties of water vapor and drizzle in and below the clouds.

[Read more](#)

Due to the Covid-19 pandemic, HPCAT, a Chicago-based research consortium to advance high-pressure science in multidisciplinary fields using synchrotron radiation, takes experiments remotely to accommodate as many as 750 experimentalists — including numerous LLNL teams.

[Read more](#)

LLNL's Center for Global Security Research (CGSR) releases “Negotiating with Putin's Russia: Lessons Learned from a Lost Decade of Bilateral Arms Control,” a new CGSR paper on global security that sheds light on understanding U.S.–Russia arms control negotiations from an American perspective.

[Read more](#)

LLNL machine learning group researcher Jose Cadena is one of several LLNL computer scientists to present work applying machine learning to electronic health records



YELLOW LINKS ARE ACCESSIBLE ON THE LAB'S INTERNAL NETWORK ONLY.

BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



Scientists in the National Atmospheric Release Advisory Center (NARAC) provide atmospheric dispersion analyses during the Fukushima emergency. Pictured are three of the many current and former NARAC scientists, left to right: Fernando Aluzzi, Matthew Simpson and Kristen Yu.

“The Livermore response was a significant Labwide effort, with a total of 78 employees contributing, including atmospheric scientists, health physicists, chemists, physicists, radiation detection specialists, engineers, computer scientists, technicians and administrative staff.”

– Lee Glascoe, program leader for Livermore’s Nuclear Emergency Support Team

at the first session of a multi-institutional Data Science Institute AI in Healthcare workshop.

[Read more](#)

PEOPLE

Outgoing LLNL Director Bill Goldstein receives honors from the Department of Energy and the National Nuclear Security Administration in recognition of his significant accomplishments as a scientist, leader in national security and director of LLNL.

[Read more](#)

Col. Joe Tringe, a group leader at LLNL and an Air Force reservist, serves as the final decision authority during the recent successful unarmed Minuteman III intercontinental ballistic missile launched from Vandenberg Air Force Base.

[Read more](#)

Jeene Villanueva, a computer scientist and group leader at LLNL, represents the Laboratory at the 2021 Lab Manager Diversity Digital Summit, “Building Better Labs: Diversity, Equity and Inclusion.” Villanueva, one of four expert speakers, is featured during the two-day virtual event and offers guidance on topics to help the lab manager community better understand the challenges, obstacles and successes of diverse lab scientists.

[Read more](#)

Coinciding with International Women’s Day, Lawrence Livermore National Laboratory’s 4th Women in Data Science regional event brings women together to discuss successes, opportunities and challenges of being female in a mostly male field.

[Read more](#)

Mona Dreicer, who served as the deputy director of LLNL’s Center for Global Security Research for six years until her retirement in 2020, is named a recipient of the

National Nuclear Security Administration Administrator’s Distinguished Service Gold Award.

[Read more](#)

LLNL’s Center for Global Security Research (CGSR) releases “Europe’s Evolving Deterrence Discourse,” a new CGSR occasional paper that explores the evolving nuclear deterrence dialogue in Europe and identifies ways to inject new momentum into that dialogue.

[Read more](#)

Energy Secretary Jennifer M. Granholm extends her appreciation in honor of Employee Appreciation Day, to the DOE workforce for choosing public service, protecting the nation, advancing science and making America’s clean energy future possible, day in and day out.

[Read more](#)

The Security Organization’s Eagle Eye Award is presented to Cindy Green and Brianna Centeno of the Materials Engineering Division and Debbie Leal of the Engineering Directorate for their attention to detail and security awareness.

[Read more](#)

OPERATIONS

LLNL and the Monterey-based Naval Postgraduate School (NPS) sign a five-year memo of understanding that provides a framework for NPS faculty and student research collaboration with LLNL and reciprocal involvement of LLNL staff in NPS research and academic activities.

[Read more](#)

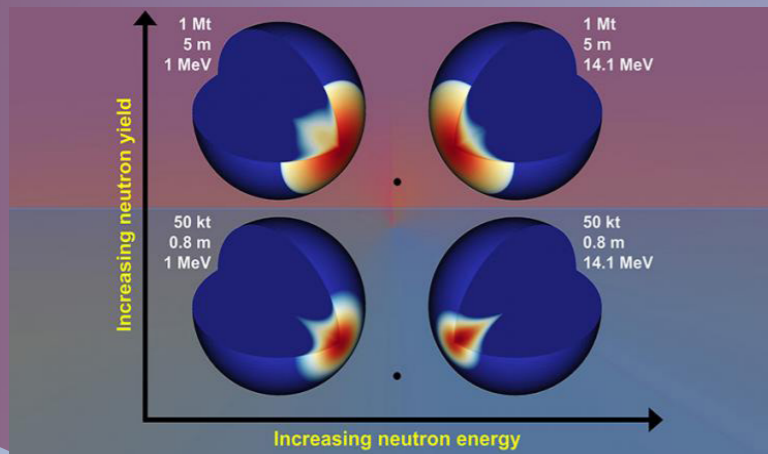
The Lab observes the 10-year anniversary of Fukushima, when a 9.0 Richter-scale earthquake and tsunami in Japan resulted in severe damage to the Fukushima Dai-ichi nuclear power plant and also led to releases of radioactivity into the environment.

[Read more](#)



YELLOW LINKS ARE ACCESSIBLE ON THE LAB’S INTERNAL NETWORK ONLY.

BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



A standoff detonation of a nuclear device irradiates an asteroid and deposits energy at and beneath the surface. In this work, two neutron yields (50 kt and 1 Mt) and two neutron energies (14.1 MeV and 1 MeV) were the primary case studies compared side-by-side. The black dots represent the location of the standoff nuclear device. The colors in the asteroids show the intensities and distributions of differing neutron energy depositions. The dark blue color indicates where the asteroid remains solid. All other colors are where material is melted and/or vaporized, which allows for blow-off debris to be ejected, changing the asteroid's velocity and deflecting it.

“It is important that we further research and understand all asteroid mitigation technologies in order to maximize the tools in our toolkit.”

– Lansing Horan IV, Lab scientist

New Lab Director Kim Budil delivers her first message to employees: “Time to lace up our track shoes.”

[Read more](#)

The Department of Energy directs a COVID-19 “safety pause” at all its facilities, including those within the NNSA complex. Lab Director Kim Budil kicks off the pause with a message.

[Read more](#)

LLNL receives approval from NNSA to provide paid administrative leave to employees for the time they take to receive a vaccination for COVID-19. While vaccinations are voluntary, employees are encouraged to be vaccinated at the earliest opportunity and to do so in accordance with local and state guidelines.

[Read more](#)

In celebration of Women’s History Month, the Lawrence Livermore Laboratory Women’s Association invites all employees to participate in Women’s Wednesdays, special noon time presentations on each Wednesday throughout the Month of March.

[Read more](#)

Cynthia Rivera, principal associate director of Operations and Business, discusses a safe and secure environment to enable the Laboratory’s work as part of the senior management team’s recent series of commitments that complement the Lab’s values.

[Read more](#)

The Laboratory receives a shipment of approximately 2,000 first doses of the Pfizer vaccine. On-site vaccinations begin.

[Read more](#)

LLNL’s Laboratory Directed Research and Development (LDRD) Program publishes its annual program report for

fiscal year 2020, available online. The report features some of LLNL’s most innovative research, including several LDRD-funded projects that focus on developing medical countermeasures to mitigate the impact of COVID-19.

[Read more](#)

Gov. Newsom signs SB 95 into law, providing up to 80 hours of COVID-19 supplemental paid sick leave to employees working in California.

[Read more](#)

Section 3610 of the CARES Act authorizes agencies to fund paid leave for employees who are unable to work due to the COVID-19 pandemic and is the mechanism by which the Laboratory has been approved to make Authorized Leave available to employees during the COVID-19 pandemic.

[Read more](#)

APRIL

SCIENCE AND TECHNOLOGY

A research collaboration between LLNL and the Air Force Institute of Technology investigates how the neutron energy output from a nuclear device detonation can affect the deflection of an asteroid.

[Read more](#)

Scientists at Lawrence Livermore and Lawrence Berkeley national laboratories — in collaboration with the University of Michigan — uncover a surprising, self-improving property in silicon and gallium nitride that contributes to the material’s highly efficient and stable performance in converting light and water into carbon-free hydrogen.

[Read more](#)



YELLOW LINKS ARE ACCESSIBLE ON THE LAB’S INTERNAL NETWORK ONLY.

BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



Under a new memorandum of understanding, researchers at Lawrence Livermore National Laboratory (LLNL), IBM and Red Hat aim to enable next-generation workloads by integrating LLNL’s Flux scheduling framework with Red Hat OpenShift. Pictured, from left, are LLNL postdoctoral researcher Dan Milroy and computer scientists Stephen Herbein and Dong H. Ahn.

“Cloud systems are increasingly setting the directions of the broader computing ecosystem, and economics are a primary driver.”

– Bronis de Supinski, chief technology officer of Livermore Computing at LLNL

LLNL releases flowcharts that illustrate the nation’s consumption and use of energy. Americans used 92.9 quads (quadrillion BTU) of energy in 2020, which is approximately 7 percent less energy, due in part to the COVID-19 pandemic.

[Read more](#)

A team of scientists from LLNL describe a high-precision interferometer system, newly developed to measure the pressure dependence of the refractive index and its dispersion in diamond anvil cells.

[Read more](#)

A team of scientists conduct an analysis of directly driven gold sphere experiments to test heat transport models used in inertial confinement fusion and high energy density modeling.

[Read more](#)

Scientists from LLNL and the Laboratory for Laser Energetics work to improve polar direct drive neutron sources on NIF, the world’s most energetic laser.

[Read more](#)

A team of interdisciplinary researchers, led by LLNL and the Colorado School of Mines, demonstrates the power of using nuclear decay in high-rate quantum sensors in the search for sterile neutrinos. The findings are the first measurements of their kind.

[Read more](#)

Under a new memorandum of understanding, researchers at LLNL, IBM and Red Hat aim to enable next-generation workloads by integrating LLNL’s Flux scheduling framework with Red Hat OpenShift to allow more traditional high performance computing jobs to take advantage of cloud and container technologies.

[Read more](#)

Researchers develop a compression scaling model that is benchmarked to 1D implosion simulations spanning a variety of relevant implosion designs. This model is used to compare compressibility trends across all existing indirect-drive layered implosion data for three ablaters.

[Read more](#)

The Data Science Institute’s first-ever virtual event concludes with the third and final workshop on artificial intelligence in health care, featuring work by Lawrence Livermore and others in applying machine learning to COVID-19 research.

[Read more](#)

PEOPLE

Researchers from LLNL and their colleagues who help them commercialize technologies win three national technology transfer awards from the Federal Laboratory Consortium, the most national awards that LLNL has ever won in a single year’s competition over the past 36 years.

[Read more](#)

The Society for Industrial and Applied Mathematics (SIAM) selects LLNL computational mathematician Rob Falgout as an esteemed member of its 2021 Class of SIAM Fellows.

[Read more](#)

Bronis R. de Supinski, LLNL’s chief technology officer for Livermore Computing, is one of the top influencers and “people to watch” in the high-performance computing industry for 2021, according to *HPCwire*.

[Read more](#)



The Krell Institute honored Lawrence Livermore National computational scientist Jeff Hittinger with its 2021 James Corones Award in Leadership, Community Building and Communication for his work with the Department of Energy's Computational Science Graduate Fellowship and applied math programs and his mentorship and research activities.

“Jim (Corones) helped shape the field of computational science as it grew over the last three decades, and I am both honored and a bit overwhelmed to be recognized in his memory. I had the opportunity to work with and learn from him, and it's with pleasure — and a sense of responsibility — that I am able to continue and to build on his vision for the DOE CSGF program and computational science more broadly.”

– Computational scientist Jeff Hittinger

LLNL salutes air force reservists as a vital part of the Lab's workforce.

[Read more](#)

Three LLNL postdoctoral appointees are selected to attend the 70th annual Lindau Nobel Laureate meeting in Germany thanks to the University of California President's 2021 Lindau Nobel Laureate Meetings Fellows Program.

[Read more](#)

Chris Cross, deputy associate program leader for Weapons and Complex Integration's Strategic Partnership Programs, receives the Meritorious Civilian Service Award from the Department of the Army for his time on the Army Science Board.

[Read more](#)

The Krell Institute, a nonprofit organization serving the scientific and educational communities, awards LLNL computational scientist Jeff Hittinger with its 2021 James Corones Award in Leadership, Community Building and Communication.

[Read more](#)

The Lab welcomes retired Maj. Gen. Julie. Bentz for a series of briefings and tours. Bentz, who serves on WCI's External Review Committee, meets with Director Kim Budil before touring the National Security Vault and the National Ignition Facility. She also participates in briefings and a roundtable discussion on countering nuclear, chemical and biological threats.

[Read more](#)

OPERATIONS

COVID-19 HPC Consortium scientists and stakeholders meet virtually to mark the consortium's one-year anniversary, discussing the progress of research projects and the need to pursue a broader organization

to mobilize supercomputing access for future crises.

[Read more](#)

LLNL, Sandia National Laboratories, Lawrence Berkeley National Laboratory and SLAC National Accelerator Laboratory, as part of the Bay Area Lab Innovation Networking Center, showcase partnership mechanisms at a three-day event specifically designed for businesses. The series, dubbed “Open the Door to Partnerships,” features fast-paced 45-minute programs, alongside opportunities to ask specific questions directly to lab officials.

[Read more](#)

LLESA launches “Family Fun Month” to engage employees, contractors and their families virtually.

[Read more](#)

James “Hondo” Geurts, undersecretary of the U.S. Navy, sends a letter of thanks to lead editor Zachary Davis, congratulating the team for its work on “Strategic Latency Unleashed: The Role of Technology in a Revisionist Global Order and the Implications for Special Operations Forces.” The book is a collection of essays on disruptive effects of the technology revolution written by scholars from the Center for Global Security Research.

[Read more](#)

LLNL calls attention to Autism Awareness Month, providing an opportunity to appreciate and recognize autism awareness and neurodiversity as a component of LLNL's diversity, equity and inclusion initiatives.

[Read more](#)

LLNL Director Kim Budil gives her first all-hands talk since assuming the role, presenting her goals for the coming months as the Lab readies for a phased return to on-site work.

[Read more](#)



In a study at the University of California, San Francisco, neurologists place thin-film multi-electrode arrays developed at Lawrence Livermore on the exposed hippocampus of patients undergoing epilepsy-related surgeries. Pictured are LLNL researchers Michael Triplett (left) and Jenny Zhou.

“The combination of precision data from these devices with next-generation data analytics promises to not only further our understanding of the inner workings of the brain, but lead to transformative cures for neurological disorders.”

– Shankar Sundaram, director of LLNL’s Center for Bioengineering

The Laboratory releases the annual report for fiscal year 2020 to provide stakeholders, sponsors and employees with a summary of LLNL’s national security mission milestones, programmatic and operational accomplishments and contributions to the community.

[Read more](#)

MAY

SCIENCE AND TECHNOLOGY

LLNL and UC Merced scientists and collaborators from the Max Planck Institute of Biophysics in Germany find use for carbon nanotubes to enable direct drug delivery from liposomes through the plasma membrane into the cell interior by facilitating fusion of the carrier membrane with the cell.

[Read more](#)

Predatory bacteria – bacteria that eat other bacteria – grow faster and consume more resources than non-predators in the same soil, according to a new study by LLNL and Northern Arizona University.

[Read more](#)

LLNL scientists find that bacteria present in soils and sediments can facilitate the precipitation of uranium-phosphate minerals that do not precipitate abiotically.

[Read more](#)

Ten LLNL scientists take part in the 7th IAA Planetary Defense Conference, hosted by the United Nations Office for Outer Space Affairs in cooperation with the European Space Agency. Team members also present on the effects of modeling the NASA Double Asteroid Redirection Test spacecraft’s detailed geometry in its high-speed impact with asteroid Dimorphos, planned for fall 2022.

[Read more](#)

The Advanced Data Analytics for Proliferation Detection program brings together researchers from LLNL and other national laboratories to enable earlier detection of low-profile nuclear proliferation.

[Read more](#)

Using thin-film multi-electrode arrays developed at LLNL, UCSF researchers generate never-before-seen recordings of brain activity in the hippocampus, a region responsible for memory and other cognitive functions.

[Read more](#)

A new LLNL analysis of satellite cloud observations finds that global warming causes low-level clouds over the oceans to decrease, leading to further warming.

[Read more](#)

LLNL scientists use three-dimensional radiation hydrodynamics simulations to quantify how high-energy-density (HED) mixing is similar to or different from non-HED mixing. The work is the culmination of nearly five years of research by a multidisciplinary team of 16 LLNL scientists.

[Read more](#)

A Lab researcher and collaborators analyze the diversity protist communities associated with the rhizosphere and surrounding soil of switchgrass plants in different developmental stages.

[Read more](#)

LLNL scientists and international collaborators outline key challenges and future directions in using machine learning and other data-driven techniques to better understand extreme conditions that potentially pave the pathway to nuclear fusion as an industrial power source.

[Read more](#)

New research by LLNL climate scientists and collaborators shows that satellite measurements of the



“Jupiter is especially interesting because it’s thought to have helped protect the inner-planet region where Earth formed. We may be here because of Jupiter.”

– Raymond Jeanloz, co-author and professor

temperature of the troposphere (the lowest region of the atmosphere) may have underestimated global warming over the last 40 years.

[Read more](#)

Research conducted at LLNL is the first to apply neural networks to the study of high-intensity short-pulse laser-plasma acceleration, specifically for ion acceleration from solid targets.

[Read more](#)

LLNL scientists and collaborators reveal experimental evidence to support the prediction of helium rain on planets such as Jupiter and Saturn, showing that helium rain is possible over a range of pressure and temperature conditions that mirror those expected to occur inside these planets.

[Read more](#)

Scientists examine the performance of pure boron, boron carbide, high-density carbon and boron nitride ablaters — the material that surrounds a fusion fuel and couples with the laser or hohlraum radiation in an experiment — in the polar direct drive exploding pusher platform, which is used at the National Ignition Facility.

[Read more](#)

PEOPLE

Materials scientist Bill Pitz is selected as a 2021 SAE fellow. SAE International is a global association committed to advancing mobility knowledge and solutions for the benefit of humanity.

[Read more](#)

Local high school students learn what it’s like to be one of the more than 150 machinists who work at LLNL during the Materials Engineering Division’s Manufacturing Workshop.

[Read more](#)

Director Kim Budil and Deputy Director for Science and Technology Pat Falcone welcome University of California Regent and LLNS Board of Governors Chair Jonathan “Jay” Sures to the Lab.

[Read more](#)

In honor of Military Appreciation month, LLNL begins a monthly showcase of those who have served in the armed forces or are currently serving to exemplify the Laboratory’s commitment to veterans and armed forces service members.

[Read more](#)

Linda Bauer, deputy director of the Laboratory, discusses the Lab’s commitment serving the best interests of our nation.

[Read more](#)

Two Lawrence Livermore postdoctoral researchers are among a select group of 200 scientists invited to attend the 8th Heidelberg Laureate Forum, an international conference that connects young researchers with laureates of the major prizes in mathematics and computer science.

[Read more](#)

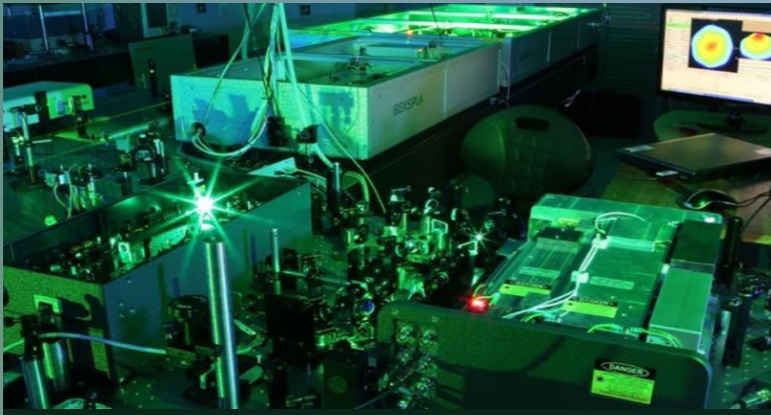
The 2021 Conference on Computer Vision and Pattern Recognition, the premier conference of its kind, features two papers co-authored by a LLNL researcher targeted at improving the understanding of robust machine learning models.

[Read more](#)

The summer student program is back in full swing. The 2021 program continues virtually this year, welcoming approximately 600 students to the Laboratory.

[Read more](#)

Penn State graduate student Joseph Mattocks is selected to serve at Lawrence Livermore as part of the



Engineers at Lawrence Livermore National Laboratory and their collaborators develop a light-activated switch that, if fully deployed on the electrical grid, could reduce carbon emissions by more than 10 percent.

“Without discovering the physics and parameters behind a phenomenon, any material is simply a black box. Once we knew how much vanadium we needed to put in, it opened up a whole new avenue for looking at the problem.”

– Paulius Grivickas, physicist and staff scientist, remarking on a light-activated switch

Department of Energy’s Office of Science Graduate Student Research Program.

[Read more](#)

OPERATIONS

The Laboratory is honored by the American Indian Science and Engineering Society *Winds of Change* magazine as one of the Top 50 STEM Workplaces in 2021, as an organization setting the standard for indigenous STEM professionals.

[Read more](#)

GetActive, the six-week health challenge where employees can engage in some fun competition with others at the Lab to be as active as you can, kicks off.

[Read more](#)

The East Gate located off Greenville Road reopens, marking another milestone on the Return to New Normal.

[Read more](#)

The Timekeeping and Integrated Management of Effort application becomes available for all Lab employees, replacing LITE.

[Read more](#)

JUNE

SCIENCE AND TECHNOLOGY

Engineers at the Laboratory and their collaborators develop a light-activated switch that, if fully deployed on the electrical grid, could reduce carbon emissions by more than 10 percent.

[Read more](#)

Scientists from LLNL and the Laboratory for Laser Energetics describe how a laser-plasma system can be

tuned to produce large and measurable changes in the group velocity of light.

[Read more](#)

Using a new approach, dubbed shockless or ramp compression, a team from LLNL, Sandia National Laboratories and the University of Hyogo determine how gold and platinum compress when they are squeezed to 1 terapascals (TPa) with extremely high precision. Then, they used their data to derive new pressure scales to 1 TPa.

[Read more](#)

A LLNL team highlights how nuclear weapon blasts close to the Earth’s surface create complications in their effects and apparent yields.

[Read more](#)

A team of LLNL materials and computer scientists create machine learning models that can predict molecules’ crystalline properties from their chemical structures alone, such as molecular density. This offers an efficient method to infer a material’s properties, thus expediting materials design and discovery.

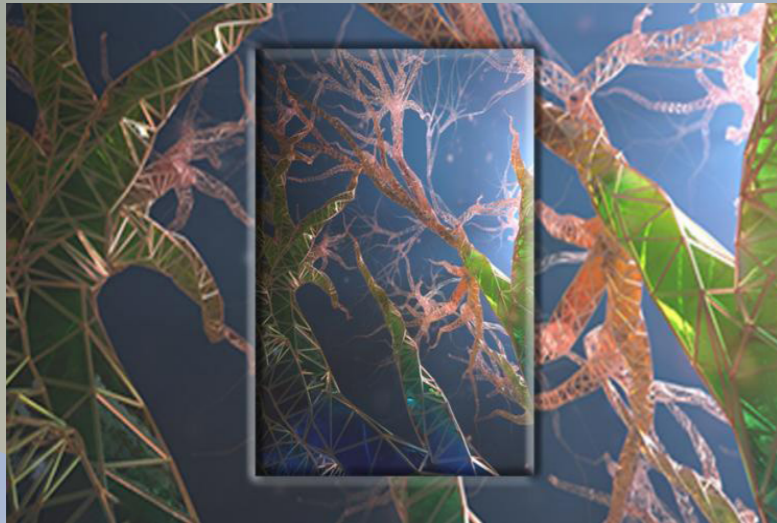
[Read more](#)

Thousands of images of Earth and space are taken by a compact space imaging payload developed by LLNL researchers and its collaborator Tyvak Nano-Satellite Systems. Known as GEOStare2, the Tyvak nanosatellite weighs 25 pounds and flies into orbit aboard a SpaceX Falcon 9 rocket launched from NASA’s Kennedy Space Center.

[Read more](#)

LLNL engineers design a new kind of laser-driven semiconductor switch that can theoretically achieve higher speeds at higher voltages than existing photoconductive devices. The development of such a device could enable next-generation satellite communication systems capable of transferring more data at a faster rate and over longer distances, according to the research team.

[Read more](#)



Inspired by the way plants absorb and distribute water and nutrients, Lawrence Livermore National Laboratory researchers develop a groundbreaking method for transporting liquids and gases using 3D-printed lattice design and capillary action phenomena. Illustration by Jacob Long/LLNL.

“Porous media — like sponges or paper or fabrics — generally tend to have disordered microstructure and are therefore difficult to describe analytically and computationally. Cellular fluidics allows you to, in a sense, create an ordered ‘sponge,’ where liquids and gases travel exactly where you want them to go.”

— LLNL staff scientist Nikola Dudukovic

For the first time, LLNL scientists identify all the subtypes of healthy cartilage in a healthy joint and conduct a 1:1 assessment of molecular changes associated with joint injury in these subpopulations of cells, pointing the way toward the development of effective methods for cartilage repair and regeneration.

[Read more](#)

Scientists at LLNL collaborate with the Princeton Plasma Physics Laboratory to design a novel X-ray crystal spectrometer, named HiRAXS, to provide high-resolution measurements of a challenging feature of high energy density matter produced by National Ignition Facility experiments.

[Read more](#)

A team of scientists from the Lab, the University of Texas at Austin and General Atomics conducts experimental measurements of hot electron production using a short-pulse, high-contrast laser on cone and planar targets. Increasing the coupling into high-energy electrons in these interactions is crucial for developing applications from laser-plasma interactions.

[Read more](#)

Research by an LLNL physicist and a host of collaborators sheds new light on one of the major challenges to realizing the promise and potential of quantum computing — error correction.

[Read more](#)

LLNL researchers develop 3D-printed micro-architected structures capable of containing and flowing fluids to create extensive and controlled contacts between liquids and gases.

[Read more](#)

Lawrence Livermore and Sandia National Laboratories continue to collaborate on diagnostic advancements on the nation’s premier high-energy density facilities.

[Read more](#)

Scientists at Lawrence Livermore determine that heating N95 respirators up to 75 degrees Celsius for 30 minutes deactivates a surrogate coronavirus without compromising the device’s fit and its ability to filter airborne particles.

[Read more](#)

PEOPLE

Gen. John W. “Jay” Raymond, chief of Space Operations for the United States Space Force, visits the Laboratory for briefings and tours.

[Read more](#)

Two scientists from LLNL are recipients of the 2021 Department of Energy’s Office of Science Early Career Research Program award. Andrea Schmidt and Xue Zheng are among 83 scientists nationwide selected for the recognition.

[Read more](#)

Under Secretary of Defense for Policy Colin Kahl and Deputy Assistant Secretary of Defense for Strategy and Force and Development Eric Ridge visit the Laboratory for briefings and tours.

[Read more](#)

Rachelle Jeppson is selected as the chief financial officer (CFO) for LLNL. As CFO, Jeppson oversees the Lab’s \$2.6 billion annual budget and provides management and leadership for a large staff of financial professionals covering accounting, budget and financial analysis.

[Read more](#)

Over the three weeks of the Data Science Challenge, students from the University of California, Merced collaborate online with mentors at LLNL to tackle a real-world challenge problem: using machine learning to identify potentially hazardous asteroids that could pose an existential threat to humanity.

[Read more](#)



YELLOW LINKS ARE ACCESSIBLE ON THE LAB’S INTERNAL NETWORK ONLY.

BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



First Lt. Jaida Sinclair and Capt. Ashley Oerlemans Zepeda serve in the Reserve Officers' Training Corps (ROTC) together and recently became part of the same Army reserves unit.

“Service is a family tradition. My grandfather on my dad’s side was part of the Stoottroepen, an infantry regiment composed of members of the Dutch Resistance during WWII. My grandfather on my mom’s side served in both the Korean and Vietnam Wars. My dad was a U.S. military police officer, and I have multiple cousins that have served in the U.S. Army as well.”

– Ashley Oerlemans Zepeda

Four aspiring machinists officially join an exclusive club — LLNL’s Machinist Apprenticeship Program — by signing their apprenticeship agreements during an indenturing ceremony at the Lab.

[Read more](#)

Engineer Bill Pitz earns a lifetime distinguished achievement award from the Department of Energy’s Vehicle Technologies Office for his significant contributions to the field of chemical kinetics. Pitz, along with retiree Charles Westbrook, produced a chemical kinetic study of fuel additives for engine knock in spark ignition engines, a feat that earned them the 1991 Horning Award from the Society of Automotive Engineers.

[Read more](#)

LLNL joins in the celebration of the U.S. Army birthday on June 14. LLNL is proud to have several Army reservists as part of the workforce. Lab employees First Lt. Jaida Sinclair and Capt. Ashley Oerlemans Zepeda, who have been friends for 10 years, are featured.

[Read more](#)

Laboratory health physicist Brooke Buddemeier is re-elected for a third term to the National Council on Radiation Protection and Measurements.

[Read more](#)

The Global Security Principal Directorate holds an all-hands meeting and its biannual Gold Awards ceremony to recognize outstanding contributions and one-time achievements that are above and beyond the demands of normal job performance.

[Read more](#)

The Weapons and Complex Integration Principal Directorate holds its annual Gold Awards ceremony to recognize outstanding contributions and one-time achievements in support of the Laboratory’s national security missions.

[Read more](#)

The African American Body of Laboratory Employees celebrates Juneteenth with keynote speaker Aziza Shepherd.

[Read more](#)

In honor of Pride Month, each year the Livermore Pride employee resource group brings forward speakers and forums of interest to PRIDE members to provide opportunities to further the culture of inclusion at work for all Lab employees.

[Read more](#)

OPERATIONS

The Lab’s new telecommuting policy and accompanying website is now available to employees.

[Read more](#)

The Lab extends its blanket telecommuting agreement, which allows employees to work from home without a formal agreement, through the end of September 2021.

[Read more](#)

In a virtual all-hands meeting attended by nearly 4,400 employees, Lab Director Kim Budil lays the groundwork for a new flexible part-time telecommuting policy, allowing employees to return to the workplace under a hybrid approach, incorporating both telework and on-site work.

[Read more](#)

Department of Energy Secretary Jennifer M. Granholm participates in a special “virtual visit” to the Lab, hosting a virtual town hall meeting for all Laboratory and NNSA Livermore Field Office employees.

[Read more](#)



YELLOW LINKS ARE ACCESSIBLE ON THE LAB’S INTERNAL NETWORK ONLY.

BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



Working with Stanford University and oil and gas company Total American Services, Lawrence Livermore National Laboratory researchers and their collaborators demonstrate that 3D printing can be used to rapidly enhance electrochemical reactors for CO₂ conversion, increasing efficiency while broadening fundamental understanding of the reactions. Illustration by Veronica Chen/LLNL.

“The real advantage for using 3D printing is that we can literally have an idea, design a new reactor, print it and test it within 24 hours.”

– LLNL scientist Jeremy Feaster

JULY

SCIENCE AND TECHNOLOGY

Using wind tunnel measurements and computational fluid dynamics simulations, Lawrence Livermore engineers demonstrate that aerodynamically integrated vehicle shapes decrease body-axis drag in a crosswind, creating large negative front pressures that effectively “pull” the vehicle forward against the wind, much like a sailboat.

[Read more](#)

LLNL staff scientists report real-time measurements of the product gases arising from the thermal decomposition of explosive TATB (1,3,5-triamino-2,4,6-trinitro benzene), its deuterated analogue and plastically bonded TATB (LX-17).

[Read more](#)

The National Ignition Facility adds a new tool to its growing list of capabilities: the inverted-corona platform, which does not rely on spherically symmetric laser irradiation.

[Read more](#)

A team of LLNL researchers, in partnership with two other national laboratories, launches a project studying the viability of large-scale hydrogen storage in geologic formations.

[Read more](#)

Just a few bacterial groups found in ecosystems across the planet are responsible for more than half of carbon cycling in soils, according to new findings from researchers at Lawrence Livermore and Northern Arizona University.

[Read more](#)

A Lawrence Livermore scientist and collaborators demonstrate the first ever “defect microscope” that can track how populations of defects deep inside macroscopic materials move collectively.

[Read more](#)

Scientists from LLNL and the Laboratory for Laser Energetics describe a simple 3D model in hohlraums and capsules for inertial confinement fusion implosions. The model will assist in delivering the required implosion symmetry on layered deuterium-tritium implosions for ignition.

[Read more](#)

Lawrence Livermore scientists and their collaborators leverage the power of 3D printing to improve the performance of electrochemical reactors used to convert carbon dioxide to useful energy sources, chemicals and material feedstocks.

[Read more](#)

An LLNL team conducts the first series of combined environment ground tests on a W80-4 test article to ensure that the warhead will survive thermal, shock and vibration environments that the system could be exposed to when it is in the stockpile.

[Read more](#)

A polymer production enclave, in partnership with the Kansas City National Security Campus and Lawrence Livermore, is on-budget and on schedule to bring modern technology into the nuclear security enterprise.

[Read more](#)

LLNL scientists experimentally test the predictions of a 2020 study that computationally investigated the effect of melting on shock-driven metal microjets.

[Read more](#)

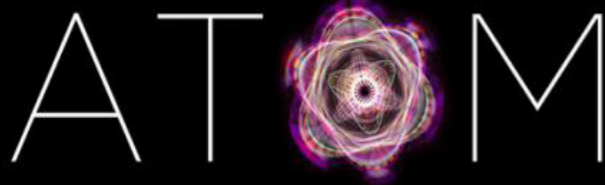
Lawrence Livermore is one of 17 U.S. national laboratories to enter a partnership with prominent publishers, journals and other organizations in scientific publishing to support name-change requests from researchers on past published papers.

[Read more](#)



YELLOW LINKS ARE ACCESSIBLE ON THE LAB'S INTERNAL NETWORK ONLY.

BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



Lawrence Livermore National Laboratory and The Data Mine learning community at Purdue University partner to speed up drug design using computational tools under the Accelerating Therapeutic Opportunities in Medicine (ATOM) project.

“The ATOM team’s work in computational drug discovery appeals to our students across all disciplines: pharmacy, engineering, chemistry, biology, etc.”

– Data Mine Program Director Mark Ward

LLNL delivers eight prototype pulsed-power modules for testing to Los Alamos National Laboratory, marking completion of a key milestone in a multi-lab effort to develop Scorpius, a next-generation particle accelerator for X-ray imaging.

[Read more](#)

PEOPLE

The Lawrence Livermore Laboratory Women’s Association and Diversity, Equity and Inclusion programs at Lawrence Livermore National Laboratory, in partnership with the Livermore Lab Foundation, host a candid and meaningful virtual panel presentation discussing a variety of issues raised in “Picture a Scientist.”

[Read more](#)

Secretary of Energy Jennifer M. Granholm virtually visits Lawrence Livermore National Laboratory, where she meets with leading scientists and engineers, toured Lab facilities and learned about key research efforts.

[Read more](#)

U.S. Rep. Jackie Speier and staffers from the House Permanent Select Committee on Intelligence visit LLNL. In addition to meeting with senior management, Lab researchers brief Speier on LLNL’s Z Program and inertial confinement fusion, concluding her visit with a tour of NIF.

[Read more](#)

Jill Hruby is sworn in by Secretary of Energy Jennifer M. Granholm as the DOE’s under secretary for nuclear security and administrator of the National Nuclear Security Administration (NNSA).

[Read more](#)

LLNL recognizes five graduates of the Machinist Apprenticeship Program for 2020 and 2021, honoring them for completing the demanding four-year apprenticeship and recognizing

their passage to becoming registered journeyman machinists in the State of California.

[Read more](#)

OPERATIONS

Director Kim Budil announces the launch of the Lab’s Return to New Normal (RTNN) website, a comprehensive resource for updates, tools and information related to RTNN.

[Read more](#)

AUGUST

SCIENCE AND TECHNOLOGY

To take advantage of the growing abundance and cheaper costs of renewable energy, Lawrence Livermore scientists and engineers 3D print flow-through electrodes, core components of electrochemical reactors used for converting CO₂ and other molecules into useful products.

[Read more](#)

The Advanced Sources and Detectors Project team at Lawrence Livermore, comprised of engineers, mechanical designers, technical staff and physicists, designs a multi-pulse Scorpius Linear Induction Accelerator for use at the Nevada National Security Site for flash X-ray radiography of subcritical experiments.

[Read more](#)

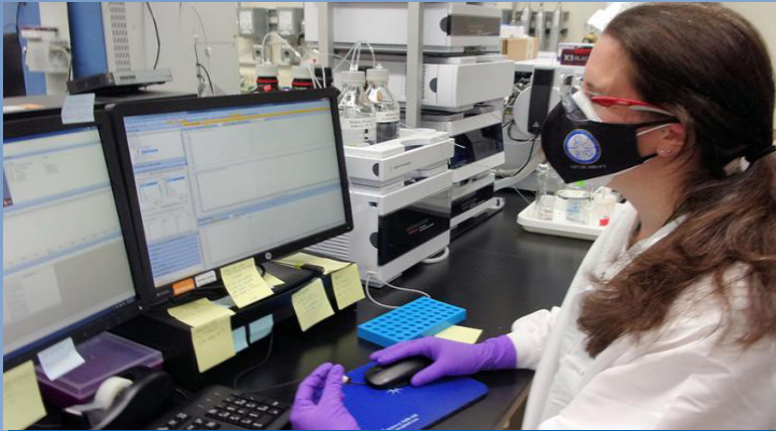
Through an engagement with Purdue University’s The Data Mine learning community, LLNL and Purdue partner to speed up drug design using computational tools under the Accelerating Therapeutic Opportunities in Medicine project.

[Read more](#)



YELLOW LINKS ARE ACCESSIBLE ON THE LAB’S INTERNAL NETWORK ONLY.

BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



Lab Forensic Science Center analytical chemist Carolyn Fisher utilizes a liquid chromatography-quadrupole time-of-flight instrument to identify chemical weapon plasma-adducts and urine metabolites in complex human plasma and urine samples from the 6th Organisation for the Prohibition of Chemical Weapons biomedical proficiency test.

“What added to our angst was that we didn’t know if the samples were degrading with time. Even with the delivery delay, the LLNL team did a great job and received the top grade for the 6th OPCW Biomedical Proficiency Test.”

– Armando Alcaraz, principal investigator for the Lab’s OPCW work

Scientists, including several from Lawrence Livermore, observe changes in the Earth’s climate in every region and across the whole climate system, according to the latest Intergovernmental Panel on Climate Change Report. Many of the observed climate changes are unprecedented in thousands, if not hundreds of thousands of years, and some of the changes already set in motion — such as continued sea-level rise — are irreversible over hundreds to thousands of years.

[Read more](#)

Lawrence Livermore scientists improve the understanding of nuclear cloud rise using a widely adopted and strongly validated weather modeling tool.

[Read more](#)

LLNL researchers explore high-pressure behavior of shock-compressed tantalum at the Omega Laser Facility at the University of Rochester’s Laboratory for Laser Energetics.

[Read more](#)

An experiment at the National Ignition Facility (NIF) makes a significant step toward ignition, achieving a yield of more than 1.3 megajoules. This advancement puts researchers at the threshold of fusion ignition, an important goal of the NIF and opens access to a new experimental regime.

[Read more](#)

A team from LLNL successfully collects data from the recent operational test of an Air Force Global Strike Command unarmed Minuteman III intercontinental ballistic missile launched from Vandenberg Space Force Base.

[Read more](#)

PEOPLE

Bradley Wallin is named Lawrence Livermore National Laboratory’s principal associate director for Weapons and Complex Integration.

[Read more](#)

LLNL Forensic Science Center scientists earn an “A” grade in the Organisation for the Prohibition of Chemical Weapons’ biomedical proficiency test.

[Read more](#)

The Fusion Power Associates Board of Directors selects Lawrence Livermore National Laboratory experimental physicist Tammy Ma as the recipient of its 2021 Excellence in Fusion Engineering Award.

[Read more](#)

OPERATIONS

Leaders from the National Nuclear Security Administration, Congressional representatives and local elected officials gather at Lawrence Livermore National Laboratory to celebrate an expansion to the Livermore Valley Open Campus.

[Read more](#)

Lawrence Livermore partners with the Livermore Lab Foundation and an innovative program called SMASH, an organization with a mission to build a strong, diverse and socially conscious tech workforce by leveling the playing field through academic learning and experiential engagement for high school and college students.

[Read more](#)

SEPTEMBER

SCIENCE AND TECHNOLOGY

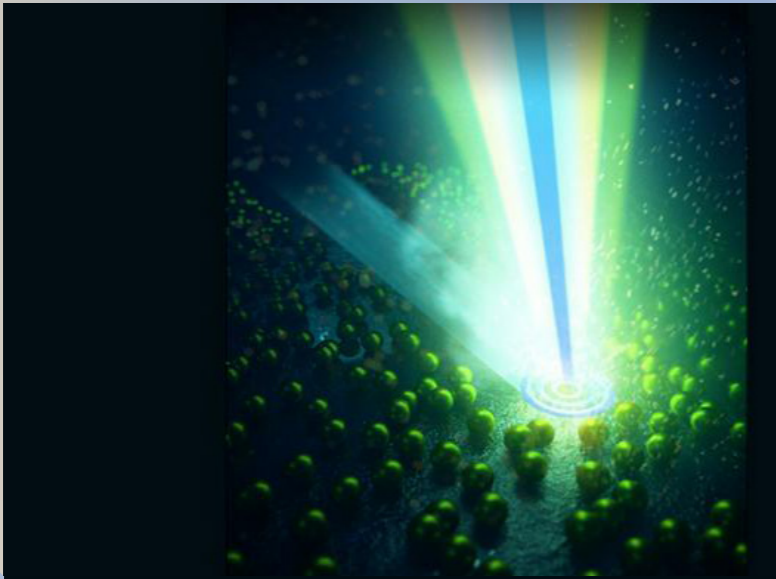
New research involving LLNL scientists shows that water can remain liquid in a metastable state when transitioning from liquid to a dense form of ice at higher pressures than previously measured.

[Read more](#)



YELLOW LINKS ARE ACCESSIBLE ON THE LAB’S INTERNAL NETWORK ONLY.

BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



To address porosity and defects in metal 3D printing, Lawrence Livermore National Laboratory researchers experiment with exotic optical laser beam shapes known as Bessel beams — reminiscent of bullseye patterns. Image by Veronica Chen/LLNL

“Using Gaussian beams is a lot like using a flamethrower to cook your food; you don’t have a lot of control over how heat is deposited around the material.”

– Lead author and LLNL research scientist Thej Tumkur Umanath

By studying isotopic variations of the elements vanadium and strontium, a team of researchers, including scientists from Lawrence Livermore, find that the variations are not caused by irradiation from the sun but are produced by condensation and evaporation reactions in the early solar system.

[Read more](#)

A new study investigates how marine bacteria are adapted to consume the carbon produced by the two major types of photosynthetic phytoplankton in the oceans, which has implications for understanding of carbon sequestration in the current and future ocean.

[Read more](#)

LLNL scientists examine how shock waves and electric discharges interact in particle-laden flows. The work has implications for environments such as volcanoes, where radio frequency emissions from lightning may transmit information about conditions inside the eruption.

[Read more](#)

Lawrence Livermore researchers focus on fast flows in thermonuclear fusion.

[Read more](#)

LLNL scientists develop a new approach using machine learning to study the phase behaviors of superionic water found in ice giants Uranus and Neptune with unprecedented resolution.

[Read more](#)

Lawrence Livermore explores laser beam shaping to improve metal 3D printing.

[Read more](#)

NNSA and LLNL announce the awarding of a subcontract to Dell Technologies for additional supercomputing systems to support NNSA’s nuclear deterrent mission.

[Read more](#)

LLNL scientists and collaborators propose a new mechanism by which nuclear waste could spread in the environment. The new findings have implications for nuclear waste management and environmental chemistry.

[Read more](#)

High-explosive research, development, test and evaluation work at Lawrence Livermore continues to meet the needs of the nation on behalf of NNSA. One specific effort is the high-explosive pressing capability, which is a critical component of LLNL’s national security mission.

[Read more](#)

A LLNL scientist develops a new theory of airborne infectious disease spread. The work demonstrates good agreement with data from Q fever, Legionnaire’s disease and Valley fever outbreaks.

[Read more](#)

LLNL scientists develop a new, versatile antidote to counteract exposure to nerve agent poisoning.

[Read more](#)

Newsline looks at the Lab’s response immediately following the Sept. 11 attacks and its contributions since that day 20 years ago. [Read more](#)

Read more: [BASIS grew into the BioWatch system.](#)

Read more: [Lab technologies continue to protect the nation against explosives, radiological and nuclear terrorism](#)

Read more: [Lab’s first responders recall shock, triumph and tragedy in Sept. 11 aftermath](#)

Read more: [NARAC is at the forefront in a post-9/11 world](#)

Read more: [The institutional response to 9/11 – with ‘our track shoes on’](#)

Read more: [Lab veterans share perspectives of 9/11](#)

LLNL scientists work on a new diagnostic capability that will provide, for the first time, the ability to make X-ray radiographic movies.

[Read more](#)



Lab garners five technology commercialization grants: Simon Pang (left) and Buddhinie Jayathilake assemble and prepare a prototype bubble column electrobioreactor to test additively manufactured three-dimensional electrodes. Under their project, excess renewable electricity from wind and solar sources would be stored in chemical bonds as renewable natural gas. Photo by Nathan Ellebracht.

“Our larger grants significantly increase our odds of getting these technologies into the commercial stream. And our smaller projects give us the chance to mature the technologies and better explore their value.”

– Rich Rankin, director of the Lab’s Innovation and Partnerships Office

LLNL uses optics to spot an elusive aurora on Mars.
[Read more](#)

PEOPLE

The Council of the American Meteorological Society selects LLNL atmospheric scientist Mark Zelinka to receive the Henry G. Houghton Award.
[Read more](#)

LLNL Director Emeritus George Miller receives the 2021 John S. Foster Medal for his contributions to U.S. national security and in recognition of his outstanding service to the nation. Miller is the sixth recipient of the medal.
[Read more](#)

U.S. Strategic Command names its 2020 Team of the Year, which included LLNL’s Mark Wittig.
[Read more](#)

Navy Strategic Systems Program recognizes Randy Simpson, Paul Nyholm and Charlie Carter for contributions to Conventional Prompt Strike program.
[Read more](#)

OPERATIONS

A project involving Lab researchers and other collaborators receive DOE funding as part of an effort to adapt scientific software for next-generation high-performance computing systems.
[Read more](#)

A LLNL-led effort in data compression is one of nine projects recently funded by DOE for research aimed at shrinking the amount of data needed to advance scientific discovery. The Lab is among five DOE national laboratories to receive awards totaling \$13.7 million for data reduction in scientific applications.
[Read more](#)

The Lab announces a new Virtual Discovery Center experience.
[Read more](#)

Environment, Safety & Health, with support of the Director’s Office, establishes a new monitoring program for air quality to support critical safety decisions during poor air quality events related to smoke and wildfires.
[Read more](#)

OCTOBER

SCIENCE AND TECHNOLOGY

An LLNL team wins \$15 million to study how microbes affect carbon storage.
[Read more](#)

New research looks at how late-stage nuclear disruption can protect Earth from asteroids.
[Read more](#)

Research from an LLNL scientist and colleagues from the University of Kentucky and Indiana State University shows that climate change in the Sierra Nevada has profoundly altered its lake ecosystems.
[Read more](#)

Lawrence Livermore research shows how big the large non-nuclear explosion in Beirut really was.
[Read more](#)

LLNL researchers observe laser-driven tin ejecta microjet interactions, which play an important role in understanding a wide range of natural phenomena, ranging from planetary formation to cloud interactions.
[Read more](#)



Tammy Ma, Xueqiao Xu and Tilo Doeppner are honored as APS fellows.

“The rapid advance of artificial intelligence and machine learning is poised to play an ever-increasing role in the development of next-generation fusion power plants.”

– Xueqiao Xu, physicist

Lawrence Livermore researchers are part of a team to help update a new version of the Energy Exascale Earth System Model, which is two times faster than its earlier version, released in 2018.

[Read more](#)

LLNL engineers deliver final optical components for the world’s newest telescope: the Vera C. Rubin Observatory in Chile.

[Read more](#)

LLNL and Penn State scientists demonstrate how a protein can be recovered and purified for radioactive metals like actinium that could be beneficial for both next-generation drugs used in cancer therapies and the detection of nuclear activities.

[Read more](#)

LLNL joins the international Human Vaccines Project, bringing Lab expertise and computing resources to the consortium to aid development of a universal coronavirus vaccine and improve understanding of immune response.

[Read more](#)

Similar to grass stems, LLNL scientists create nanostrut-connected tube-in-tubes that enable stronger low-density structural materials.

[Read more](#)

LLNL researchers now have a better understanding on how strong the magnetic fields are in an inertial confinement fusion implosion at the National Ignition Facility.

[Read more](#)

Researchers from LLNL and Sandia National Laboratories turn to metal hydrides to help store hydrogen because they provide exceptional energy densities and can reversibly release and uptake hydrogen under relatively mild conditions.

[Read more](#)

LLNL prepares for the upcoming exascale-class behemoth high-performance computer El Capitan with a massive energy and water upgrade.

[Read more](#)

PEOPLE

Lawrence Livermore scientists and engineers win three R&D 100 awards, often dubbed the “Oscars of invention.”

[Read more](#)

LLNL takes part in Research Slam!, a speaking competition for postdocs. Winners include: Rebecca Walton (first place), Sarah Sandholtz (second place), Brandon Foley (third place) and Mariana Desiree Reale Batista (people’s choice).

[Read more](#)

The American Physical Society selects three LLNL physicists as 2021 fellows: Tilo Doeppner, Tammy Ma and Xueqiao Xu.

[Read more](#)

LLNL hosts four graduate awardees selected by DOE’s Office of Science Graduate Student Research program’s 2021 Solicitation 1 cycle. The four include: Connor Bray from Colorado School of Mines; Megan Foley from Northern Arizona University; Connor Ganley from Johns Hopkins University; and Jared Stimac from University of California-Davis.

[Read more](#)

Bruce Goodwin, a senior fellow at LLNL’s Center for Global Security Research and nuclear weapons designer, writes “Nuclear Weapons Technology 101 for Policy Wonks.”

[Read more](#)

Deputy Assistant Secretary of Defense for Nuclear Matters Drew Walter visits the Lab. The purpose of the visit is for Walter to receive briefings on a wide variety of Lab programs.

[Read more](#)



YELLOW LINKS ARE ACCESSIBLE ON THE LAB’S INTERNAL NETWORK ONLY.



BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



A returning adult spring-run Chinook salmon leaps from the water in California's Central Valley. Photo courtesy of Carson Jeffres/UC Davis.

“Otoliths are like tiny chart recorders in the salmon that allow us to tell which fish go to the ocean early and which ones wait.”

- Peter Weber, LLNL analytical chemist

Three Laboratory teams and one individual win the 2021 Director's Diversity, Equity and Inclusion awards.

[Read more](#)

Twelve scientists and engineers are award recipients of the seventh annual Early and Mid-Career Recognition Program.

[Read more](#)

Renowned physicist Alex Chernov turns 90 and his 15-year career at the Lab comes after a distinguished international career.

[Read more](#)

Two Laboratory teams win the 2021 Director's Science & Technology awards.

[Read more](#)

Heather Mulcahy, a chemistry and processing liaison at Lawrence Livermore, begins an offsite assignment at the Kansas City National Security Campus.

[Read more](#)

OPERATIONS

LLNL scientists and engineers secure five major grants through DOE's Technology Commercialization Fund.

[Read more](#)

Lab Director Kim Budil updates employees on next steps in the Return to New Normal in her all-hands meeting.

[Read more](#)

Health Services acquires doses of the Johnson & Johnson and Moderna COVID-19 vaccines, and now has a supply of all three available COVID-19 vaccines.

[Read more](#)

Health Services drive-thru and walk-up flu clinics begin for the 2021-2022 season.

[Read more](#)

LLNL holds a Labwide ice cream extravaganza to recognize the dedication of the workforce and celebrate the official transition to a hybrid workplace.

[Read more](#)

The Weapons and Complex Integration directorate hosts its External Review Committee. The theme for this year's meeting is "Strategic Framework: Update and Next Steps."

[Read more](#)

NOVEMBER

SCIENCE & TECHNOLOGY

Researchers at Lawrence Livermore develop a new diagnostic tool that can determine the quality of metal droplets and monitor liquid metal jetting prints in real time.

[Read more](#)

LLNL researchers and collaborators examine the ear bones of salmon, called otoliths, which record the water chemistry as they grow, finding that late-migrating fish that spend a year in their home streams as juveniles leave in the fall and arrive in the ocean larger and more likely to survive their years at sea.

[Read more](#)

LLNL scientists find that atomic disorder in certain boron-based hydrogen storage systems can potentially improve the rate of hydrogen uptake.

[Read more](#)

The western U.S. experiences a rapid increase of fire as the vapor pressure deficit (VPD) increases in the area during the warm season. New research by scientists at the University of California, Los Angeles and LLNL shows that two-thirds (approximately 68 percent) of the increase in VPD is due to human-caused climate change.

[Read more](#)



YELLOW LINKS ARE ACCESSIBLE ON THE LAB'S INTERNAL NETWORK ONLY.

BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



Ana Racoveanu synthesizes energetic compounds with isotopic labels to help make munitions safe to handle and use. Photo by Julie Russell/LLNL.

“To paraphrase ‘Star Trek,’ Ana has made several labeled compounds for my project and the results have taken us places we have never gone before. As her success has become more and more obvious, some other scientists have approached her to make isotopically labeled materials for their projects.”

– Lab scientist John Reynolds

Along with collaborators at the University of Massachusetts, Dartmouth and the University of Mississippi, an LLNL mathematician discovers a machine learning-based technique capable of automatically deriving a mathematical model for the motion of binary black holes from raw gravitational wave data, requiring only the computing power of a laptop.

[Read more](#)

The scientific computing and networking leadership of the U.S. Department of Energy’s national laboratories is on display at SC21, the International Conference for High-Performance Computing, Networking, Storage and Analysis.

[Read more](#)

Helping the general public and students learn about carbon neutrality, the options for carbon dioxide removal, as well as the effects of climate change, is the focus of the Carbon Cleanup Initiative, a unique public awareness partnership from the Livermore Lab Foundation and Lawrence Livermore.

[Read more](#)

New research from Lawrence Livermore and collaborators finds that rock weathering — the process of chemical transformation by long exposure to water and the atmosphere — boosts soil organic carbon storage by altering soil mineralogy.

[Read more](#)

Research conducted at Lawrence Livermore takes a closer look at entropy — the measure of internal energy per unit temperature that is unavailable for doing useful work — in experiments at the National Ignition Facility.

[Read more](#)

Lawrence Livermore takes part in NASA’s first-ever planetary defense test, which deliberately collides a spacecraft into an asteroid called Dimorphos.

[Read more](#)

PEOPLE

A suite developed by a Lawrence Livermore team to simplify evaluation of approximation techniques for scientific applications wins the first-ever Best Reproducibility Advancement Award at the 2021 International Conference for High Performance Computing, Networking, Storage and Analysis (SC21).

[Read more](#)

LLNL scientist Ana Racoveanu, a staff scientist in Lawrence Livermore’s Materials Science Division, creates energetic compounds with isotopic labels. The primary goal of this work is to make munitions safe to handle and use.

[Read more](#)

LLNL Director Kim Budil and NNSA LFO Manager Pete Rodrik present LLNL and LFO team members from the Expand Electrical Distribution System project with plaques in recognition of their Secretary of Energy’s Achievement Award for Project Management.

[Read more](#)

Runners from LLNL take top honors as the fastest lab during the sixth annual DOE Mile. Overall, LLNL wins the DOE Mile this year on the men’s side and got 3rd on the women’s side based on team scoring.

[Read more](#)

The American Indian Activity Group employee resource group and the Lab community celebrate National Native American Heritage month.

[Read more](#)

The Pit Product Realization Team holds its first in-person meeting at LLNL. It is the first time the team has met in-person since early March 2020.

[Read more](#)



SC21 General Chair Bronis R. de Supinski opens the conference's keynote session by welcoming remote and in-person attendees to St. Louis, noting the unique challenges of preparing a large international conference during the COVID-19 pandemic and presenting the theme for SC21 — "Science and Beyond." Photo courtesy of SC Photography.

"We are now pushing the fields of large multi-scale simulations into new realities."

– LLNL computer scientist Harsh Bhatia

Cyrus Abari, LLNL's current 3D Sensing lead, begins a three-year assignment to the Department of Defense - Navy Strategic Systems Program in Washington, D.C. [Read more](#)

Ian Waters, an LLNL design physicist, begins a one-year assignment to the DOE Office of Intelligence and Counterintelligence and the Office of Nuclear Forensics in Washington, D.C. [Read more](#)

Ken Bruner, LLNL's current United States Indo-Pacific Command liaison, begins a multi-year offsite assignment to the United States Space Command in Colorado Springs, Colorado. [Read more](#)

Twelve Laboratory employees become the first graduates of the Air Force Institute of Technology graduate certificate program through the Laboratory's distance-learning partnership. [Read more](#)

Department of Energy (DOE) Deputy Secretary of Energy David Turk visits Lawrence Livermore National Laboratory for a full day of tours and briefings. It is the first visit to the Laboratory for the second-in-command at DOE. [Read more](#)

OPERATIONS

The Department of Energy's (DOE's) High Performance Computing for Energy Innovation initiative, managed by Lawrence Livermore, seeks proposals for projects that can leverage DOE supercomputing to advance clean energy technologies. [Read more](#)

For the first time ever, the 2021 International Conference for High Performance Computing, Networking, Storage and

Analysis is hybrid, with dozens of both in-person and virtual workshops, technical paper presentations, panels, tutorials and "birds of a feather" sessions. [Read more](#)

The performance management task force launches a survey to better represent the employees' views and concerns in the task force's recommendations. [Read more](#)

Lab scientists and engineers who report records of invention for their technologies and developments have a new system for making their submissions. [Read more](#)

The Return to New Normal team shares safety tips and reminders for holiday travel to help employees stay vigilant while on the road (or in the air). [Read more](#)

The 2021 Helping Others More Effectively Campaign surpasses the \$1 million mark, with pledges of \$1,022,857 to charitable organizations and a 5 percent participation rate. [Read more](#)

The Lab honors LLNL veterans during Veterans Day. [Read more](#)

LLNL revises the process for visitors, specifically unbadged visitors coming on-site, generally for short durations. [Read more](#)



YELLOW LINKS ARE ACCESSIBLE ON THE LAB'S INTERNAL NETWORK ONLY.

BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.



LLNL physicist Omar Hurricane receives a 2021 Edward Teller Award, which comes with an engraved silver medal.

“It’s a great honor to be recognized by colleagues who supported my nomination for the award and it’s very gratifying to get recognition for the nine years of problem solving that got us to the threshold of ignition. More important than the medal, I’m grateful for the team of great people who chose to work with me.”

– LLNL physicist Omar Hurricane

DECEMBER

SCIENCE & TECHNOLOGY

Researchers at Lawrence Livermore show for the first time the potential for linear induction accelerators (LIAs) to deliver effective, targeted doses of “FLASH” radiation to cancer patients. The new technique selectively kills cancer cells with minimal damage to healthy cells.

[Read more](#)

LLNL and University of California, San Francisco researchers find that the flexibility of thin-film microgrid arrays, combined with higher-density grid spacing, provides greater levels of detail about how the brain works, while also providing the ability to stimulate areas of the brain affected by epilepsy and other neurological disorders.

[Read more](#)

LLNL researchers and collaborators create a new co-culture device, dubbed a “porous microplate,” to figure out how the phycosphere structures bacterial communities.

[Read more](#)

MJOLNIR, or the Megajoule Neutron Imaging Radiography Experiment, is a foray into the world of novel imaging techniques. LLNL’s Andréa Schmidt, Tony Link and their team push the boundaries of electrical engineering, nuclear physics and computational modeling to produce the world’s first high-speed neutron image.

[Read more](#)

A multi-institutional team, including an LLNL contributor, proposes a framework for digital twin models of cancer patients that researchers say would create a “paradigm shift” for predictive oncology.

[Read more](#)

The Laboratory establishes the AI Innovation Incubator (AI3), a collaborative hub aimed at uniting experts in artificial intelligence (AI) from LLNL, industry and academia to advance AI for large-scale scientific and commercial applications.

[Read more](#)

By looking at the range of isotopic variations in terrestrial and meteoritic samples, LLNL scientist and collaborators figure out that Earth and Mars formed by collisions of planetary embryos originating from the inner solar system.

[Read more](#)

PEOPLE

Omar Hurricane, chief scientist for the LLNL’s inertial confinement fusion program, receives the 2021 Edward Teller Award.

[Read more](#)

An all-female group of senior military officers from 12 nations visit the Center for Global Security Research (CGSR) at LLNL to share information and expertise regarding current perspectives, research and technology in areas affecting global security.

[Read more](#)

The University of California Office of the President (UCOP) announces that LLNL will host three In-Residence Graduate Fellows in 2022, with two to three years of financial support to conduct in-residence dissertation research and receive professional training.

[Read more](#)

Lab Director Kim Budil, Deputy Director Linda Bauer and Deputy Director for Science and Technology Pat Falcone honor the recipients of the 2021 Director’s Awards in a special virtual ceremony.

[Read more](#)



YELLOW LINKS ARE ACCESSIBLE ON THE LAB’S INTERNAL NETWORK ONLY.

BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.

\$3.6 Million

2021 HOME Helping Others More Effectively

LAWRENCE LIVERMORE NATIONAL LABORATORY

The Lawrence Livermore HOME Campaign raises \$3.6 million for charitable organizations.

“I am amazed by the generosity of Lab employees during these challenging times. We have proven time and time again that together, we will do our part to help support those in our communities who need it most.”

– Lab Director Kim Budil

This issue of *Newsline* was produced by the Public Affairs Office. It represents a sample of the science and technology, people and operations highlights of the year. It is available on the [LLNL website](#).

Lawrence Livermore National Laboratory is operated by Lawrence Livermore National Security, LLC, for the U.S. Department of Energy, National Nuclear Security Administration under Contract DE-AC52-07NA27344 LLNL-WEB-458451



YELLOW LINKS ARE ACCESSIBLE ON THE LAB'S INTERNAL NETWORK ONLY.
BLUE LINKS ARE ACCESSIBLE ON BOTH THE INTERNAL AND EXTERNAL LAB NETWORK.

Tom Ramos, author of the biography “Call Me Johnny,” unspools the remarkable tale of LLNL director emeritus Johnny Foster’s life and celebrates his legacy.

[Read more](#)

Aaron Miles, from LLNL’s Weapons and Complex Integration, concludes an offsite assignment with the Office of Science and Technology within the Executive Office of the President.

[Read more](#)

Paige Gasser concludes an offsite assignment with the Nuclear and Missile Defense Policy office within the Office of the Secretary of Defense for Policy.

[Read more](#)

The University of California Office of the President awards five Collaborative Research and Training Awards from its National Laboratory Fee Research Program. All five awards include LLNL scientists and engineers.

[Read more](#)

Tony Baylis, Diversity, Equity and Inclusion director at LLNL is honored by the American Indian Science and Engineering Society (AISES) as the recipient of the 2021 AISES Government Partner Service Award.

[Read more](#)

Gen. Charles Brown, chief of staff of the U.S. Air Force, and Victoria Coleman, chief scientist of the U.S. Air Force, visit LLNL.

[Read more](#)

The 16th Annual Computing Grand Challenge campaign awards more than 87,000 node hours per week to projects that address compelling, large-scale problems, push the envelope of capability computing and advance science.

[Read more](#)

OPERATIONS

Speaking live to the Lab community from a snowy forest scene, Director Kim Budil kicks off the festive season with a virtual holiday event. She opens the celebration with a highlight of the year’s many accomplishments, offering a message of thanks to Lab employees.

[Read more](#)

Lawrence Livermore National Security, LLC , the contract manager for Lawrence Livermore, announce the recipients for the 2021 LLNS Community Gift Program. These gifts, totaling \$200,000, reflect LLNS’s commitment to local communities.

[Read more](#)

Laboratory employees, along with Lawrence Livermore National Security, LLC, donate more than \$3.6 million to charitable organizations via the annual employee giving program, the Helping Others More Effectively Campaign.

[Read more](#)

The yearly tradition of inventorying all LLNS assets starts and will be completed by April 30, 2022. LLNS is mandated by DOE/NNSA regulations and Prime Contract requirements to conduct the wall-to-wall personal property inventory of all property-numbered assets.

[Read more](#)

An LLNL-led collaboration targeted at using machine learning to reduce defects and carbon emissions in steelmaking is one of eight new projects receiving Department of Energy funding through the High Performance Computing for Manufacturing Program.

[Read more](#)

LLNL publishes a countdown of the top 10 LLNL tweets of the year.

[Read more](#)