

# A YEAR OF GROWTH



# 2019 Philanthropic Report



# A Year of Growth!

In addition to the launch of several promising research initiatives and STEM programs, the Livermore Lab Foundation greatly increased its support base and reach in 2019 over the previous year, as cited below...

## Our Financials

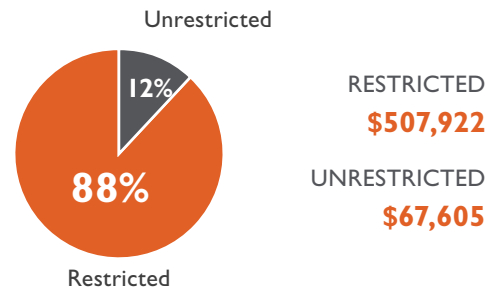
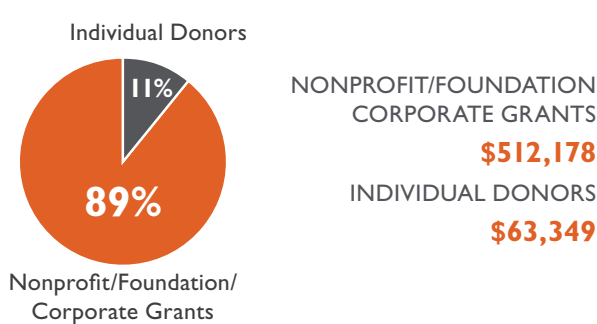
Total revenues were **\$575,527** in 2019 – **exceeding all previous years combined since LLF was established.**

### Source of Funds

Nearly 90% of this year’s revenue came from organizational partners, including two large foundation grants related to our research initiatives. Our growing base of individual donors, whose gifts largely support our STEM programs, contributed 11%.

### Donations and Pledges

Eighty-five percent of our 2019 donations were designated for specific use, including ALS research, climate research, Girls Who Code–Big, and STEM student programs.



**133%**  
increase  
# OF CORPORATE/  
FOUNDATION GRANTS

**73%**  
DONOR  
RETENTION  
FROM 2018

**77%**  
increase  
# OF INDIVIDUAL  
DONORS TO LLF

**63%**  
increase  
# of high school, undergraduate,  
and graduate students in STEM  
internships at the Lab

**150%**  
increase in  
Facebook  
followers

**93%**  
increase in mailing  
list/newsletter  
subscribers

**66**  
poster awards and special  
recognition given to outstanding  
summer graduate students at  
LLNL in 2018/2019



# The Power and Promise of Science

Last summer, I was honored to join the Livermore Lab Foundation (LLF) as the first paid staff of this growing nonprofit organization. LLF's focus on building a better future through the power of science is both compelling and timely, and I am inspired by the Foundation's efforts to extend the impact of the exceptional research and innovations occurring at Lawrence Livermore National Laboratory every day. While much of the Lab's mission is focused on national security, there are significant dual-use applications of its work for broad public benefit.



The Foundation's mission – to advance fundamental knowledge to enhance human health, safety, and quality of life for all – aligns closely with the vision of Lab co-founder E.O. Lawrence, whose belief in using 'Big Science' to address the world's most pressing issues remains more relevant than ever. As an independent 501(c)(3) entity, LLF provides a mechanism for philanthropic donors to leverage LLNL's unique expertise and facilities as they seek solutions to some of society's greatest challenges.

LLF fulfills its mission through two parallel strategies: supporting groundbreaking, multidisciplinary research aligned with the Lab's science and technology priorities, and promoting STEM (*Science, Technology, Engineering and Math*) learning opportunities to inspire the next generation of scientists and engineers. This past year marked a pivotal stage in the Foundation's evolution, as our partners, programs, and investments expanded in strategic areas.

Our research initiatives in climate science are front and center in California's important conversations on climate change. And our efforts to collaborate on a devastating rare disease are building new public-private partnerships toward a collective effort to accelerate treatments and identify a cure. In 2019, we celebrated several milestones in our STEM programs – including the launch of our first full-year undergraduate scholarship and an expanded summer high school program that doubled the number of student interns working on research teams with dedicated Lab mentors.

Finally, as the statistics on the inside cover reflect, 2019 was a year of considerable organizational growth – with new philanthropic and corporate partners, a significant increase in individual donors, heightened awareness of Foundation activities and programs, and the addition of new board members and staff. In 2020, we will continue to harness the power and promise of science and open the doors to the future. We invite your support – because it is going to take all of us, together, to ensure the science and technology our society needs and benefits from remains a priority.

A handwritten signature in cursive script that reads "Sally Allen".

Sally Allen  
Executive Director

# Research That Promises to Change the World

LLF launched its first major research initiatives in 2019, choosing to focus in two key areas: climate science and healthcare. Both disciplines provide extensive opportunities to leverage LLNL's unique capabilities in energy, earth and atmospheric science, and bioscience and bioengineering. Consistent with the Lab's 'Science on a Mission' approach, LLF-funded research efforts address challenging societal problems that can measurably benefit from the Lab's high-performance computing expertise and other core competencies.



## A Pioneering Effort to Reduce Carbon Emissions...

As part of an effort to address one of the great environmental challenges of our times, LLF (via a grant from the ClimateWorks Foundation) funded Lab researchers and scientists to identify a robust suite of technologies to help California become carbon neutral – and ultimately carbon negative – by 2045.

This first-of-its-kind report (see inset) will serve as an important resource guide for industry, academia, and policymakers. *Getting to Neutral: Options for Negative Carbon Emissions in California* was completed in 2019 and shared with key California lawmakers and industry officials in early 2020.

To reach carbon neutrality, California needs to eliminate by 2045, all carbon dioxide (CO<sub>2</sub>) emissions and also remove emissions already in the air, hence the expression, “negative emissions.” LLNL’s research team focused on three specific pillars of negative emissions: natural and working lands, carbon capture from waste biomass utilization, and direct air capture.

They identified a portfolio of approaches for achieving greater than 125 million tons per year of negative emissions for California by 2045, and evaluated the scope of state and private investment to best achieve the goal.

***“The finish line is in sight. We can become carbon neutral sooner than anticipated, at a cost less than expected, while boosting California’s economy and creating quality jobs in areas such as the Central Valley.”***

— Dr. Roger Aines  
Chief Scientist, Energy Programs, LLNL  
Author, *Getting to Neutral*

“Without CO<sub>2</sub> removal, reaching our carbon neutrality goal will be slower, and more difficult and costly,” said LLNL chemist Sarah Baker, who served as the study lead, joining 12 LLNL colleagues and peers from 8 other academic research institutions. “While there are no silver bullets, we have evaluated strategies that rely on many existing technologies and resources, creating a CO<sub>2</sub> removal blueprint that can be replicated.”



The *Getting to Neutral* report was presented to California policymakers in early 2020. Pictured, (l-r), George Peridas, LLNL; Sally Allen, Livermore Lab Foundation; Roger Aines, LLNL, Sarah Baker, LLNL; Steve Bohlen, LLNL and Jan Mazurek, ClimateWorks Foundation

***“The climate technologies the world is currently focused on – renewables and electrification – won’t be enough. We’ll need to actively clean up the atmosphere and that’s a huge challenge; one that Livermore is poised to take on.”***

**— Dr. Sarah Baker  
Chemist, LLNL**

**Lead author, *Getting to Neutral***

“Climate change is the defining issue of our time. From shifting weather patterns that threaten food production to rising sea levels that increase the risk of catastrophic flooding, the impacts of climate change are global and unprecedented,” said Dona Crawford, Livermore Lab Foundation Board President. “We are grateful and proud to have worked with the ClimateWorks Foundation to support this important research and we hope it will serve as a defining guide for action.”

In 2020, LLF will again partner with ClimateWorks and LLNL on a follow-up study to identify potential regulatory and permitting barriers to California’s carbon capture and geologic storage efforts. The report will help policy makers understand the scale and complications of carbon removal projects involving geologic sequestration, and provide recommendations for improving California’s current regulatory framework to facilitate the financing and deployment of such projects, consistent with the State’s decarbonization goals.



## An Achievable Path Forward

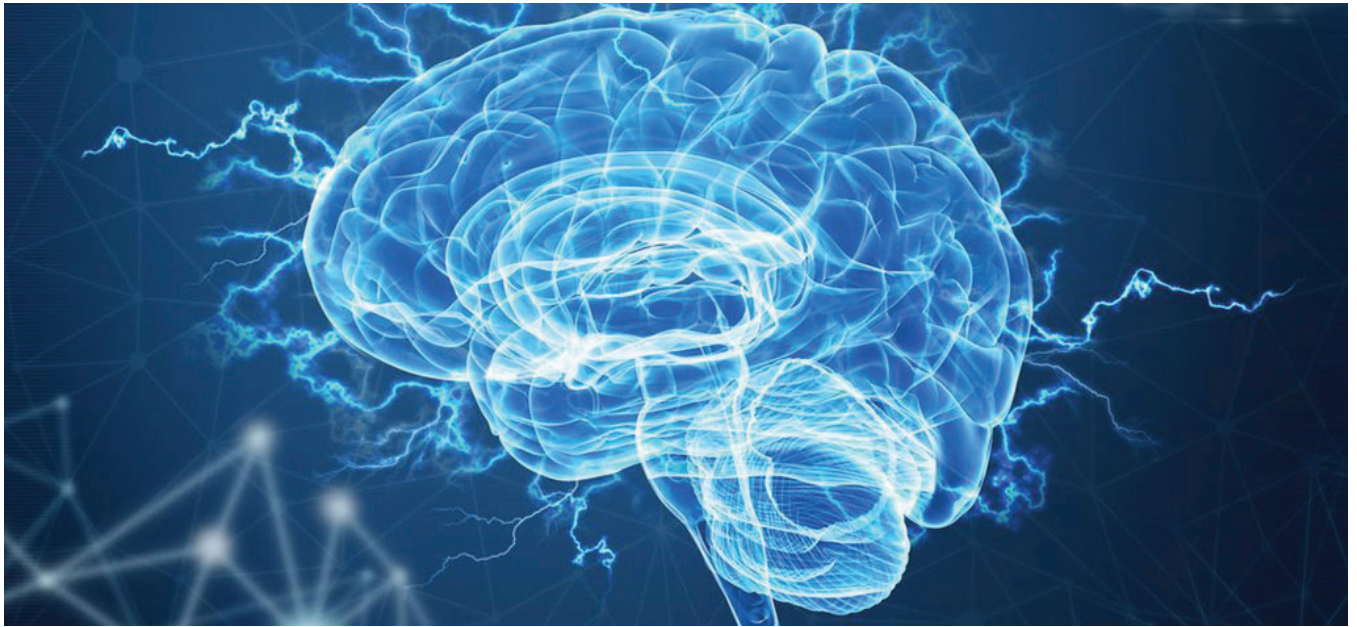
### *Key Findings from Getting to Neutral: Options for Negative Carbon Emissions in California*

- By redoubling efforts to reduce and avoid existing emissions, and proactively pursuing negative emission pathways, California can achieve its ambitious carbon-neutral goal by 2045.
- By increasing the uptake of carbon in its natural and working lands, converting waste biomass into fuels, and removing CO<sub>2</sub> directly from the atmosphere with purpose-built machines, California can remove ~125 million metric tons of CO<sub>2</sub> per year from the atmosphere by 2045, and achieve economy-wide net-zero emissions.
- These negative emissions pathways come with important co-benefits to air and water quality, resilience to a changing climate, and protection of life and property.
- Only moderately and highly mature technologies are required to achieve this negative emissions potential; however, accelerating demonstration and deployment for some of them is a key need.
- The importance of achieving this level of negative emissions stretches far beyond California – the Golden State can demonstrate to the world that carbon neutrality is achievable.

The report is available to the public at:

<https://livermorelabfoundation.org/2019/12/19/getting-to-neutral/>





## Tackling a Deadly Disease – Amyotrophic Lateral Sclerosis (ALS)

Personal stories from the local community often underscore the importance of scientific advances that have implications for broader society. Such is the case for the second major research initiative LLF launched in 2019. In 2017, Mike Piscotty, a Laboratory employee, and his son Stephen Piscotty, an outfielder for the Oakland A's, founded the ALS Cure Project in honor of Mike's wife and Stephen's mother Gretchen, who died from amyotrophic lateral sclerosis (ALS), also called Lou Gehrig's disease.

The ALS Cure Project raises funds for research into improved treatment and, eventually, a cure for this fatal disease. In June 2019, the Livermore Lab Foundation joined the cause, seeking public and private research partners to support those efforts.

“The LLF board felt this was an important program to launch as one of our initial research investments,” said Dona Crawford, President. “The Foundation and Lab are partnering to explore academic and industry research collaborations and leverage LLNL's computing capabilities to identify causal factors for ALS. One of the greatest challenges in ALS research is to identify the elusive biomarkers for the disease.”



*Mike Piscotty, (left), CEO and Founder, ALS Cure Project with Dr. Amy Gryshuk, LLNL Director, Strategic Engagements & Alliance Management. Gryshuk is leading Lab efforts to develop multidisciplinary research collaborations and accelerate options and therapies.*

LLF is funding the Laboratory to pursue multidisciplinary partnerships with research hospitals, universities and other organizations whose expertise, when combined with LLNL's core competencies, will help improve understanding of the disease and assist with the development of new therapies and treatments.

***“The promise of this effort brings hope to an ALS community struggling to find both a treatment and a cure.”***

*—Mike Piscotty  
CEO and Founder, ALS Cure Project*

Building on the success of this initial effort, the ALS Cure Project donated to the Livermore Lab Foundation to apply LLNL's world-class data analytics capabilities to ALS clinical data sets to help evaluate ALS risk and associations in various populations.

“The Lab is applying a multidisciplinary approach to conduct a longitudinal, multi-modal machine learning ALS study that we believe will be a game changer,” said Mike Piscotty. “We are grateful to the Livermore Lab Foundation for these important partnerships.”



## A Closer Look at ALS

- Amyotrophic lateral sclerosis (ALS), more commonly known as Lou Gehrig's disease, is a progressive neurodegenerative disease that attacks nerve cells and pathways in the brain and spinal cord.
- Every day, an average of 15 people are newly diagnosed with ALS – more than 5,600 people per year. As many as 30,000 Americans may currently be affected. Annually, ALS is responsible for two deaths per 100,000 people.
- ALS usually strikes people between the ages of 40 and 70. Those afflicted have included baseball great Lou Gehrig as well as theoretical physicist, cosmologist, and author Stephen Hawking.
- The average life expectancy of a person with ALS is two to five years from time of diagnosis.
- Very little is known about the disease. There are no known biomarkers.

*Data sources: als.org, alscore.net*

## Leveraging LLNL's Capabilities

*LLNL uses High-Performance Computing, Bioengineering, and Bioassays to Contribute to the ALS Research and Clinical Communities*



Identifying  
Biomarkers



Understanding  
Cellular Mechanisms



Investigating the  
Influence of Genetics



Developing New and  
Effective Treatments

# Launching the Next Generation of Scientists, Technologists, Engineers, and Mathematicians

*In 2019, the Foundation continued its mission to inspire and open the door for the next generation by expanding diverse Science, Technology, Engineering and Math (STEM) learning opportunities at LLNL. The number of STEM opportunities LLF offers each year depends entirely on funds raised from generous individual donors – many of whom are current or former Lab employees.*

## A Full-year Scholarship

Alan Noun, a Modesto, California native and computer science student at Cal State University East Bay (CSUEB), received LLF's first full-year scholarship award in 2019. In addition to a direct stipend, Noun spent nine weeks in the Lab's Data Science Summer Institute developing neural network models using synthetic imagery for geospatial analysis, working with Lab employees/mentors Michael Ward and George Weinert. He then returned to CSUEB to complete his senior year and is on track to graduate in May 2020.

Throughout the year, Noun participated in a number of special Lab events related to his major and career goals, including a cybersecurity hack-a-thon in the Fall of 2019. "My mentors gave me a lot of freedom to solve the problems on my own," noted Noun. "But they were always extremely helpful whenever I hit a brick wall. I've learned a lot during my tenure here. My biggest takeaway is that you should always take the time to fully understand a problem before tackling it. To get the right answers, you need to ask the right questions."

By providing an intensive, hands-on research experience and continued access to Lab personnel, programs and facilities, LLF is helping to draw the next generation of critical thinkers into the science pipeline. In 2020, LLF plans to provide a similar full-year scholarship experience to a UC Merced student.



LLF scholar, Alan Noun (left) with Foundation President Dona Crawford. Alan's CSEUB student team was among dozens building skills at the Lab's Fall 2019 Cybersecurity Hack-a-thon, which was designed to help defend our U.S. energy infrastructure.

*"I'm extremely proud to be a part of this amazing organization and grateful for the opportunities, experience, and skills I've developed. I know the Foundation will continue to have an impact on many [lives] and careers, just as you have on mine."*

—Alan Noun  
LLF's first college intern

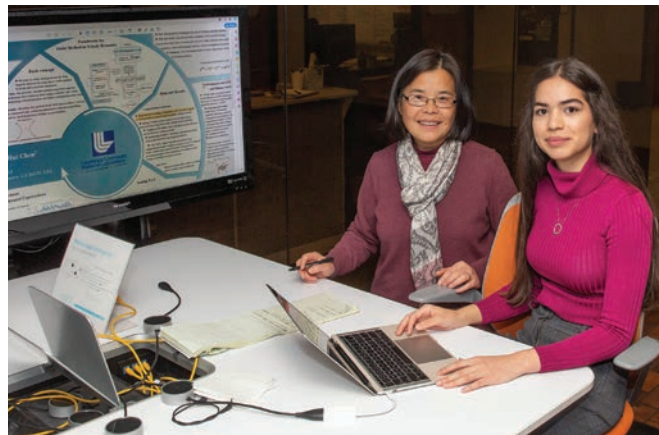


## A Commitment to Early Career Women Scientists

In early 2019 at UC Berkeley, Physics major Alexis Diaz was familiarizing herself with the famous theoretical and experimental physicists whose footsteps graced LeConte Hall over the last century. Soon after, Diaz, a sophomore, received an LLF scholarship while working as a summer intern in the Lab's High Energy Density (HED) Science Center. She used the funds to help offset tuition.

*"I hope to pay it forward by helping other young women pursue and be successful in physics careers. Thank you, Livermore Lab Foundation."*

— Alexis Diaz, UC Berkeley Early Career Scientist



Alexis Diaz (right), one of LLF's early career women scholarship recipients, with her LLNL mentor, Physicist Hui Chen.



LLF President Dona Crawford (l) presents the scholarship award to Adrianna Angulo, a UC Michigan student.

A second 2019 scholarship recipient, Adrianna Angulo, a fifth-year Physics graduate student at the University of Michigan, worked as an intern in LLNL's Academic Cooperation Program (ACP). Angulo came to the Foundation's attention through her exceptional work on fusion in the Lab's HED Science Center.

Last fall, LLF funds covered Angulo's travel costs to present her research at the International Conference on Inertial Fusion Sciences and Applications in Osaka, Japan, where she received the Chiyoe Yamanaka Award for students and young scientists.

*"I'm incredibly grateful for the effort put forth by LLF to help showcase my research to leading scientists in the field."*

— Adrianna Angulo,  
UC Michigan Early Career Scientist

These Foundation scholarship/internship opportunities are part of a broader effort to provide assistance to early career women scientists, allowing them to dedicate more time to their studies and research. The program also provides mentors who can serve as role models and peer scientists to the students throughout their academic and professional careers.



LLF President Dona Crawford (center) extends her congratulations to the 2019 high school summer interns. In addition to the four-week experience, the Foundation provided a \$1000 scholarship to each student.

## Getting a Head Start in High School

It's never too early to learn applied science. That Foundation philosophy led to the expansion of an important LLF-Lab-Livermore Valley Joint Unified School District (LVJUSD) partnership in 2019. Local students from three Livermore area high schools participated in a four-week summer internship program, with hands-on research opportunities and exposure to technical and scientific career possibilities.

Under the guidance of Lab staff mentors in Computing, Engineering, and Physical & Life Sciences, students collaborated on research teams, toured Lab facilities, and presented their work at LLNL's annual poster symposium. The program culminated with a recognition ceremony attended by LLNL staff, community leaders, and students' family and friends.

*"The real-world knowledge and expert guidance of the scientists and engineers associated with this internship provides a capstone experience for our students and their classroom learning. We are so grateful for our partnership with LLF and the Lab."*

— Dr. Kelly Bowers  
Superintendent of Schools  
Livermore Valley Joint Unified School District



Former Assemblymember (CA-16) and Foundation board member Catharine Baker (right) provided copies of the U.S. Constitution to each of the twelve high school students as part of their summer internship graduation ceremony.



“Any veteran Lab mentor will tell you that students, even at the high school level, can contribute to LLNL projects in meaningful ways. These students bring energy, curiosity, and fresh eyes,” said Terri DeLima, supervisor/operations manager for the Lab’s Center of Micro and Nanotechnology. DeLima served as the Lab’s lead coordinator for the program.

In acknowledgment of the program’s impact, Livermore Lab Director Bill Goldstein recognized the LLNL employees who lead the internship efforts with LVJUSD and LLF with a 2019 Diversity & Inclu-

sion Award – citing an inclusive pipeline that engages and provide opportunities to local, underserved students with high potential.

“This is a perfect example of how the Foundation can help ‘open the door’ to the future,” said Sally Allen, LLF executive director. “Our post-experience surveys from the students showed 100 percent satisfaction with all aspects of their four-week journey. We hope to provide similar opportunities for even more students in 2020.”

## Recognition of Student Summer Research

For the second consecutive year, LLF recognized the top poster presenters with cash awards at the Lab’s annual Student Poster Symposium in August 2019. A record 382 students participated in the two-day event, representing colleges from across the country, and several area high schools. Students showcased their summer scientific research and explained their project posters to LLNL judges and LLF representatives. This opportunity often serves as important validation for talented students to continue their pursuit of STEM research in global security, computing, engineering, and more.



*Doug Modlin, Chief Electronics Engineer at LLNL, (left) pictured with some of the top student poster presenters at the 2019 symposium. Modlin has been a strong supporter of the Lab-LLF efforts to honor student research.*



# Setting the Stage for Momentum and Growth

The Livermore Lab Foundation was formed in 2016 with an all-volunteer board of directors. Thanks to strong support from the University of California, initial administrative and operating costs were fully absorbed. In July 2019, with the hiring of Executive Director Sally Allen, who has more than 20 years experience in public and philanthropic sectors, LLF transitioned to a formal nonprofit organizational structure. LLF's second employee, Jennifer Smith joined in August 2019 as Administrative Assistant. In 2020, both Allen and Smith will work closely with LLF's strong board of directors to continue the Foundation's momentum and impact.

Two new board members, Honorable Catharine Baker and Dr. Craig Leasure, joined the Foundation in 2019. Baker, special counsel to the Pleasanton firm, Hoge, Fenton, Jones & Appel, specializes in small business and non-profit law. A staunch supporter of STEM programs and education in general, Baker represented California's 16th Assembly District from 2014-2018.

Dr. Leasure is serving as one of two UC designated directors on the LLF board. He replaces Dr. Kimberly Budil, who was named Principal Associate Director of Weapons and Complex Integration at LLNL. As UC's Vice-President for National Laboratories, Dr. Leasure has extensive executive experience in both government and industry.

*"The University of California is proud to support LLF. The Foundation's ability to leverage the power of philanthropy, support impactful research projects and educational opportunities for budding scientists, contributes to the betterment of Californians and people around the globe."*

— Brett Henrikson  
Member, LLF Board of Directors  
UC Director of National  
Laboratory Governance

## Livermore Lab Foundation Board of Directors:



Dona Crawford



Greg Suski



Catharine Baker



Michael Carter



Bill Goldstein



Brett Henrikson



James "Buck" Koonce



Craig Leasure

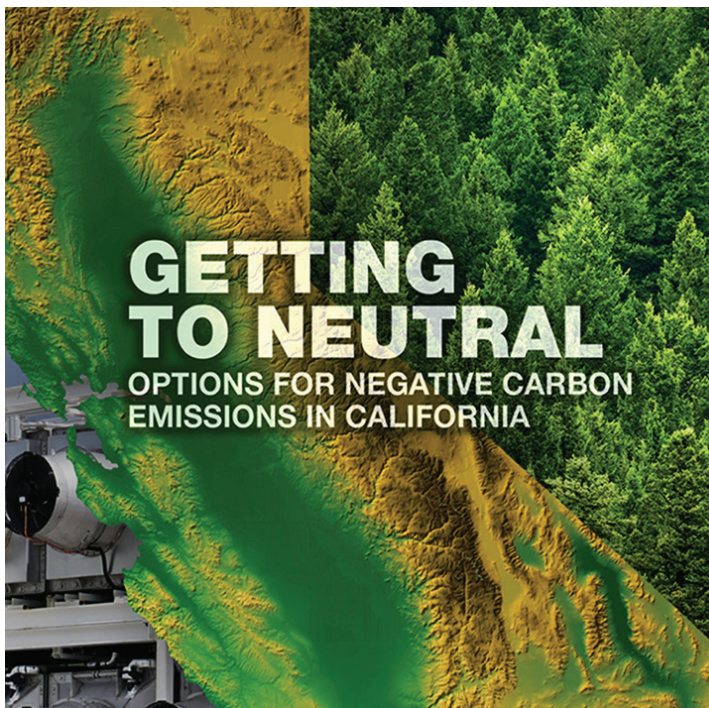
# Looking to the Future: 2020 and Beyond

*“Scientists have become the bearers of the torch of discovery in our quest for knowledge.”*

—Physicist Stephen Hawking

The Livermore Lab Foundation supports inquiry, innovation and the search for discovery in a myriad of fields. A number of new opportunities are on the horizon for 2020 and beyond.

Thanks to an incredible gift by the Clean and Sustainable Energy (CASE) Fund, LLF will provide \$1 million to help the Lab launch a science outreach program for carbon capture and storage, in support of California’s climate goals. This work will complement the 2019 *Getting to Neutral* study supported by the ClimateWorks Foundation. As CASE officials noted, providing reliable and scientifically sound carbon capture and storage information is crucial to implementing many *Getting to Neutral* recommendations. LLF is grateful to CASE for this significant investment in the power of science.



LLF's Dona Crawford with Roger Aines, Chief Energy Scientist, LLNL





## Girls Who Code – Big

In Spring 2020, LLF will introduce Girls Who Code – Big, providing local high school students a unique opportunity to work with big data technologies and supercomputing applications/programming on the Lab’s high-performance systems. On completing the program, students will take the computer hardware they build back to their home schools, providing secondary learning with their classmates. This special program was funded, in part, by women leaders (*current and retired*) at LLNL (see inset below). We salute their desire to ‘pay it forward’ and open the door for the next generation of women interested in STEM.

### Sincere thanks to these LLNL women, past and present, for investing in the future, via Girls Who Code – Big!

LISA BELK	MONA DREICER	ANNIE KERSTING	JONI SCHULD
PAT BERGE	EVI DUBE	MONYA LANE	LYNDA SEAVER
GINA BONANNO <i>(In Honor of Kim Cupps)</i>	PAT FALCONE	SUE MARLAIS & CHERYL COLLINS	JEAN SHULER
RENEE BREYER	PEG FOLTA	CELESTE MATARAZZO	LORI SOUZA
KIM BUDIL	STEPHANIE GOODWIN	CLAIRE MAX	BECKY SPRINGMEYER
BETSY CANTWELL	ERNA GRASZ	CHERRY MURRAY	LORI TAYLOR
DONA CRAWFORD	LUISA HANSEN	ERMA NERING	JANET TULK
TRISH DAMKROGER	NADINE HORNER	LINDA RAKOW	ANN WILLOUGHBY
	SUSAN HOUGHTON		

*\* Additional funds received from: Sally Allen, Gail Crawford-Porter, Diane Flynn, Intel,  
Lawrence Livermore National Security (LLNS)*

\* Visit [livermorelabfoundation.org](http://livermorelabfoundation.org) for a complete listing of all individual and foundation gifts over the past year.

These ideas and more will serve as the cornerstone of how the Livermore Lab Foundation seeks to advance the science and big ideas emerging from LLNL since 1952. Ground-breaking discoveries, multidisciplinary research and innovations by Lab scientists and engineers will continue to address some of society’s greatest challenges. Recognizing the power and promise of science to change the future, the Livermore Lab Foundation is proud to support all of it.



**“Scientific achievement is rooted in the past...cultivated to full stature by many contemporaries and flourishes only in favorable environment... where the path is smooth, progress is most rapid.”**

**— Ernest Orlando Lawrence  
Nobel Prize banquet speech  
(1940)**



**Livermore Lab Foundation**  
c/o University of California  
Office of National Laboratories  
1111 Broadway, Suite 2130 Oakland, CA 94607  
[info@livermorelabfoundation.org](mailto:info@livermorelabfoundation.org)  
[livermorelabfoundation.org](http://livermorelabfoundation.org)  
925-453-9382

**FOLLOW US ON SOCIAL MEDIA**

 <https://www.facebook.com/LivermoreLabFoundation/>

 <https://twitter.com/LivermoreLF>

 <https://www.linkedin.com/company/livermore-lab-foundation/>