ANNUAL REPORT

2023

Livermore Lab FOUNDATION

Toward a Brighter Future

> **"Embracing a future fueled by purpose and positive impact!"**
>
> *Sally Allen*

A Message from Sally Allen, Executive Director

The Livermore Lab Foundation (LLF) is dedicated to enabling philanthropic support for aspiring scientists and engineers and leading-edge scientific research at Lawrence Livermore National Laboratory (LLNL) to help address today's most complex challenges and ensure a brighter future for all.

I'm pleased to reflect on the past year and highlight how the Foundation catalyzed new partnerships, amplified the Lab's reach both in California and nationally, facilitated student connections to LLNL, and introduced the Lab's unique capabilities to new audiences.

We met record fundraising goals in 2023, most notably in our Climate portfolio, which comprised about 80% of total contributions. Highlights include a first-time Memorandum of Understanding between LLF, LLNL, and California State University, Bakersfield to encourage regional research collaborations and student engagements, and exciting new philanthropic partnerships supporting the national dissemination of LLNL's groundbreaking Roads to Removal report. These efforts enabled LLF to realize its broadest impact yet in helping to inform and engage communities about science solutions addressing our critical state, national and global climate goals.

Pursuing new sources of clean energy remains a priority for all, and LLNL's ground-breaking fusion ignition milestone and continued achievements in Inertial Fusion Energy (IFE) inspired LLF to add fusion to our key focus areas in 2023. We are honored to be part of LLNL's newly-established STARFIRE Hub, which promises to accelerate progress through greater public-private collaboration. We look forward to partnering with the Lab to support the nation's decadal vision for IFE via community engagement, education and workforce development efforts to advance long-term research and development goals.

And recognizing that the great scientists and engineers of tomorrow are today's students, our continued commitment to inspiring next-generation STEM leaders is evident through our growing fellowship placements in LLF's priority focus areas:

- Advancing Understanding of Neurodegenerative Disease
- Accelerating Climate Resilience and Carbon Removal
- Promoting the Promise of Fusion Energy

All of this would not be possible without the support of our extended community — the donors, funders and volunteers who enable our mission, strategic partners who amplify our impact and extend our reach, and Lab colleagues who inspire us with their commitment to science in the national interest. We look forward to continuing our work together, embracing a future fueled by purpose and positive impact!
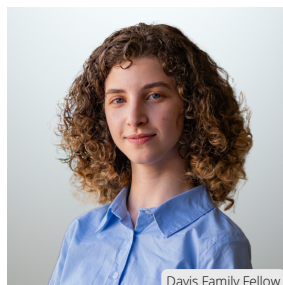
About the Cover: *Featuring our 2023 LLF Fellows cohort of undergraduate and graduate students supported by our generous donor community.*

Introducing the 2023 LLF Fellows

Julnar Al Azzam
California State University, Bakersfield
Davis Family Fellow
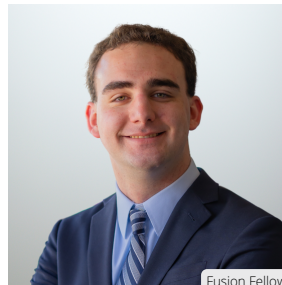
Salina Bermudez
Arizona State University
Carbon Fellow

Thomas Chuna
Michigan State University
HEDS Fellow

Jacob Crouch
University of Oklahoma
Fusion Fellow
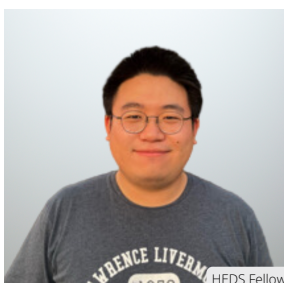
Jennifer Dagnino
University of the Pacific
Carbon Fellow

Alexis Diaz
University of California, Berkeley
HEDS Fellow

Jinyuan Dun
Osaka University
HEDS Fellow

Jhonnatan Gama Vazquez
Stanford University
HEDS Fellow

Sheindel Gamerberg
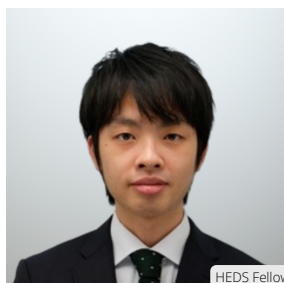*University of California, Merced*
HEDS Fellow

Everett Grethel
University of Connecticut
SIAM Undergraduate Fellow

Girik Jain
Stanford University
HEDS Fellow

Koki Kawasaki
Osaka University
HEDS Fellow

Ryan Lee
University of California, Merced
Data Science Fellow

Isabella Martinez
University of California, San Diego
HEDS Fellow

Kimberly Ann Pereirai
University of Massachusetts, Amherst
HEDS Fellow

Nathan Pulver
University of California, Los Angeles
HEDS Fellow

Tahmid Rahman
University of Maryland
HEDS Fellow

Thomas Scott
University of Tennessee, Knoxville
Foster Fellow

Eder Tavera
California State University, Bakersfield
Carbon Fellow

"We genuinely appreciate your kindness in investing in our growth as students. Your support goes a long way with helping to provide us with opportunities!"
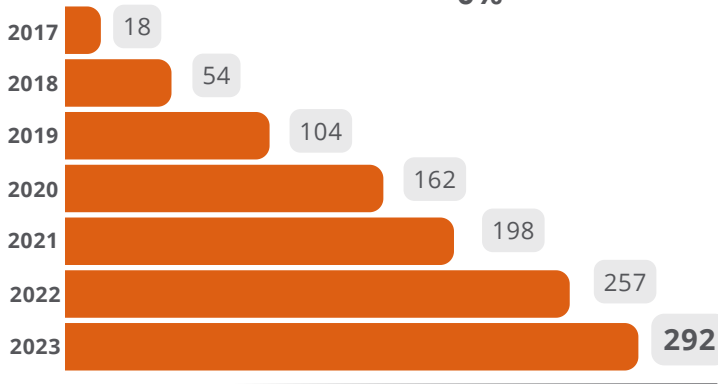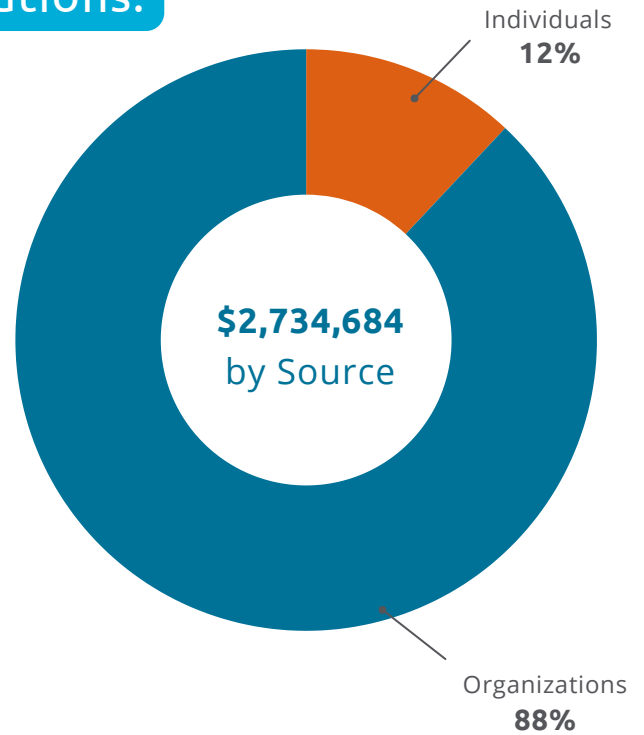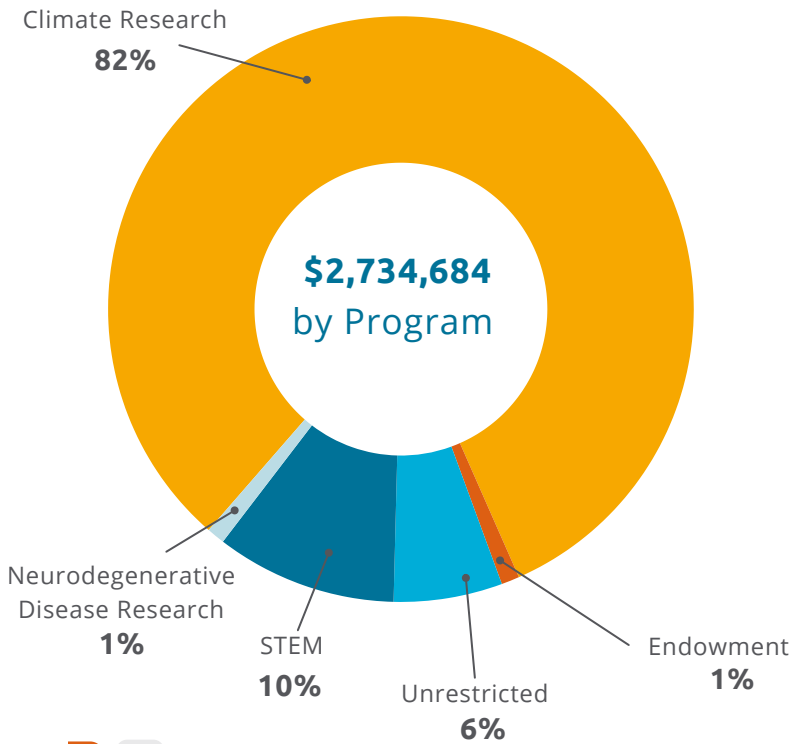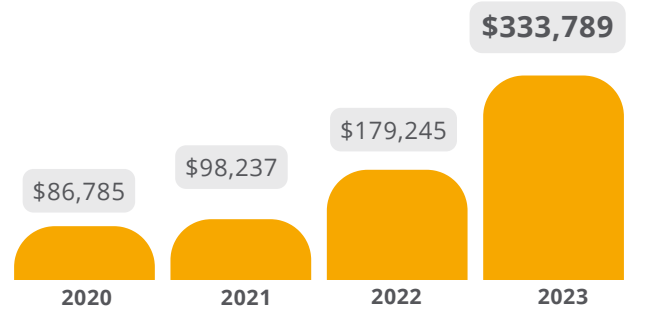
— **Alexis Diaz**
2023 HEDS Fellow

2023 By the Numbers

Total Contributions:

Climate Research
82%

$2,734,684
by Program

Neurodegenerative Disease Research
1%

STEM
10%

Unrestricted
6%

Endowment
1%

Individuals
12%

$2,734,684
by Source

Organizations
88%

Number of Unique Donors

Year	Donors
2017	18
2018	54
2019	104
2020	162
2021	198
2022	257
2023	292

Funds Raised by Individual Donors Per Year

Year	Amount
2020	$86,785
2021	$98,237
2022	$179,245
2023	$333,789

63% Donor retention from previous year (2022)

86% Increase in funds raised from individual donors over previous year (2022)
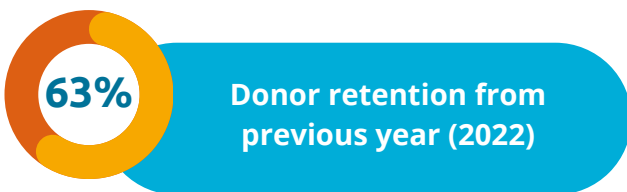
Thank You! UC's core operating support allows philanthropic contributions and grant funds to be disbursed in support of LLF's programs. Thanks to our supporters' generosity in 2023, LLF reached more students, facilitated new regional partnerships and amplified Lab science for the benefit of California and beyond.

2023 Highlights

New Partnership in Kern County

In September, LLF signed a triad Memorandum of Understanding (MOU) agreement with LLNL and California State University, Bakersfield to collaborate on advanced and clean-energy technology research, student opportunities and community partnerships that have the potential to shape the future of energy in the state and bring high-quality jobs to the Kern County region.

(Left to Right): LLF Executive Director Sally Allen, LLNL Director Kim Budil, and CSUB President Lynnette Zelezny at the MOU signing ceremony

Carolyn Zerkle speaking at July's Livermore Valley Chamber Mixer, hosted by LLF at the UC Livermore Collaboration Center

Lab Leader Joins LLF Board

Carolyn Zerkle, LLNL Principal Deputy Director and Lawrence Livermore National Security Vice President, was appointed to LLF's Board of Directors in early 2023. She is one of two Lab-designated members of the LLF Board.

> *"I look forward to collaborating closely with LLF to support the Lab's research, STEM education initiatives and workforce."*
>
> — **Carolyn Zerkle**

Connecting Our Community

LLF hosted a late-summer 'Savor the Science' gathering featuring wineries with LLNL ties to celebrate our community of donors and our collective impact! In November, we sponsored a special 'Evening with LLNL Director Kim Budil' at Livermore's Bankhead Theater, highlighting the Lab's fusion ignition milestone achievement and its history of making the impossible, possible.

(Left to Right): Livermore Mayor John Marchand, UNCLE Credit Union Board Chair Chung Bothwell, LLF Board Director, the Honorable Catharine Baker, and retired LLNL scientist Alan Burnham at September's Savor the Science event.

Tackling Neurodegenerative Disease

Science & Technology REVIEW

October/November

ACCELERATING ALS RESEARCH

Photo Source: LLNL

Since 2019, LLF has leveraged LLNL's unique supercomputing, bioengineering, and biosciences core competencies to accelerate collective efforts to diagnose, understand, and treat neurodegenerative diseases like Amyotrophic Lateral Sclerosis (ALS), Alzheimer's, Multiple Sclerosis, and Parkinson's. We've funded early-stage projects focused on biomarker identification, multimodal data analytics, and disease and therapeutic interventions that are yielding important insights into many neurological diseases affecting a growing portion of our aging society. Our portfolio, featured in a recent LLNL Science & Technology Review article, has contributed new knowledge to the broader research community and provided opportunities to inspire future STEM leaders in the life sciences field.

> *"By enabling greater research collaboration, we hope to make faster progress collectively than what would be possible individually."*
> — **Dona Crawford**
> Board Chair, Livermore Lab Foundation

During summer 2023, LLF Fellow Ryan Lee, an undergraduate from UC Merced, worked in LLNL's Biosciences and Biotechnology Division on a project using machine learning to better understand the microorganisms that live in your gut. These microorganisms play a large role in keeping the body healthy and functioning; however, they can also play a role in causing obesity, diabetes, bowel disease, and brain disorders like Parkinson's disease, autism, and many more. Understanding the human gut microbiome could help lead to cures for some of these challenging health issues.

Strengthening Neuro-Disease Prediction

Through data analysis and gene classification, Ryan built a metagenomics tool that processes data and machine learning algorithms to help fellow researchers on the project gain a better understanding of the human gut microbiome. The project goal was to accelerate neuro-disease prediction capabilities relating to the gut without the need for more costly clinical tests with human subjects.

Ryan Lee

Accelerating Climate Resilience

In December 2023, LLNL released the Roads to Removal report – a national collaborative effort by 68 scientists and 13 institutions examining regional opportunities in carbon dioxide removal. The report offers specific insights in soils and cropland practices, forest management, biomass carbon removal and storage (BiCRS), as well as direct air capture and storage (DACS), transportation, and energy, equity and environmental justice considerations. Thanks to grant funding from Breakthrough Energy, ClimateWorks Foundation and the Grantham Foundation for the Protection of the Environment, LLF is leading the public rollout of this important report – with free community symposiums planned in 2024 in California, North Carolina, Wyoming, Oklahoma, Pennsylvania and Indiana. To access the report as well as fact sheets, videos and event information, visit **roads2removal.org**

ROADS TO REMOVAL

OPTIONS FOR CARBON DIOXIDE REMOVAL IN THE UNITED STATES

LLF also continued its *Climate in the Classroom* program. More than 25 educators and 2,060 students participated in Kern, San Joaquin and Alameda counties. Thanks to a valuable partnership with the Kern County Superintendent of Schools, all lessons are now available, free of charge via the open platform, *California Educators Together.* LLF and LLNL, will update the materials on an annual basis to ensure technical accuracy.

Jennifer Pett-Ridge, senior staff scientist and lead for LLNL's Carbon Initiative, provided the keynote address at the Future of Agriculture in California summit at CSU Fresno in March 2023

The role of agriculture in California's carbon neutrality vision was center stage in Fresno in early 2023, thanks to our partnership with The Maddy Institute (Stanislaus State, CSU Fresno, CSU Bakersfield, CSU Merced) and the multi-media company Climate Now. LLNL scientists provided talks on the economics of carbon geologic storage on agricultural lands and the opportunities for farmers to transition to carbon-friendly practices. With more than 500 attendees, the event was an exciting precursor to our national Roads to Removal series.

> *"Every geographical region has both a story and an opportunity for carbon dioxide removal. Roads to Removal enables local, informed decision-making and shows us that we can prevail in our quest to reverse climate pollution."*

> — **Jennifer Pett-Ridge**
> LLNL Senior Staff Scientist and
> Lead Author of Roads to Removal

Promoting the Promise of Fusion Energy

Photo Source: LLNL

Fusion has the potential to provide a reliable, abundant, safe, and clean energy source. Repeated achievement of fusion ignition at the National Ignition Facility (NIF) as part of the U.S. Department of Energy/National Nuclear Security Administration's Stockpile Stewardship Program has also established the fundamental scientific feasibility of laser-driven inertial confinement fusion as a path toward fusion energy. Advancing the nation's decadal vision of commercial fusion energy will require public-private collaboration. LLF is partnering with LLNL to explore ways to promote public understanding of IFE, while pursuing opportunities for philanthropic investment.

In December 2023, the U.S. Department of Energy awarded a four-year, $16-million project led by LLNL and a multi-institutional team that includes LLF. This new IFE Science & Technology Accelerated Research for Fusion Innovation & Reactor Engineering (STARFIRE) Hub will advance research, technology, and workforce development efforts.

LLF strongly believes in establishing pathways and opportunities for the next generation to work in fusion to accelerate progress in this research space. In 2023, LLF established a Fusion Fellowship for students to work alongside LLNL's NIF team. Jacob Crouch, a doctoral candidate at the University of Oklahoma, was the first fellow.

Jacob contributed to a pivotal project within the Lab, focusing on assessing the feasibility of IFE power plants. Working alongside esteemed scientists and researchers, Jacob undertook a comprehensive analysis of fusion-enabling technologies. This endeavor involved evaluating various IFE approaches, identifying technological risks, and delineating key research priorities essential for the advancement of fusion energy.

Illuminating Pathways in IFE

As LLNL pioneers fusion research breakthroughs, collaborations with LLF and young talent like Jacob will be vital to making progress toward realizing sustainable fusion energy solutions.

Jacob Crouch

Inspiring Future STEM Leaders

Since 2018, we have provided <u>fellowships, research stipends, and related support</u> to over 60 students from across the country, fostering their academic and professional STEM journey by introducing them to the possibilities of an impactful career at a world-class national laboratory. Typically, we place LLF Fellows with LLNL mentors engaged in the key research areas we support (climate resilience, fusion energy, and neurodegenerative disease). The goal of our fellowships is to introduce a more diverse and inclusive group of students to LLNL, attracting many who aren't traditionally recruited from the Lab's existing networks.

LLF Fellows visiting LLNL's Center for Accelerator Mass Spectrometry as part of our Fellows Week program

Opening the door to exploration

Our efforts focus on reaching underrepresented talent within the STEM field, especially first-generation college students or those with special circumstances or a financial need. We expand and diversify LLNL's overall community of interns (and potentially future LLNL leaders) - enriching both individual lives as well as the Lab's community and workforce.

> *"LLF fellowships offer a unique point of entry for students who may not otherwise be able to find a path to working alongside distinguished industry and research leaders like those at LLNL."*
>
> — **Everett Grethel**
> 2023 SIAM Undergraduate Fellow

In 2023, LLF launched a Fellows Week program for our annual summer student cohort to facilitate connections, knowledge sharing, skill building and career development. Beyond building students' technical skills and providing exposure to world-class science, this program seeks to empower our fellows to explore a rewarding and impactful STEM career, and contributes to the nation's critical STEM workforce pipeline needed to solve issues of national and global importance.

2018	2019	2020	2021	2022	2023
2	3	9	15	20	19

Fellowships Awarded

Celebrating Legacy Through Impact

Mim John and Thomas Scott pictured with photo of Dr. Foster

Dr. John S. Foster, Jr. epitomizes visionary leadership and innovation. As the fourth Director of LLNL, he pioneered advancements in nuclear weapons technology, spearheaded crucial innovations, and helped establish LLNL's essential role in ensuring our national security. In 2015, the Lab honored Foster's legacy by creating the John S. Foster Jr. Medal (with Foster as the first recipient), an award which recognizes "innovative and inspirational leadership in providing a safe, secure and effective nuclear deterrent to ensure international peace and strategic stability."

In September 2022, Sandia National Laboratories Vice President Emerita Dr. Miriam 'Mim' John received the prestigious Foster Medal. Soon afterwards, she led the effort to establish the John S. Foster Jr. Undergraduate Fellowship – a partnership between the Livermore Lab Foundation and LLNL. "With LLF's help (along with others who are contributing), I hope that we succeed in introducing [Dr. Foster's] potential successors to the challenges and rewards of a career in national security," Mim noted.

With a goal of raising $250,000 to endow this fellowship in perpetuity, LLF was thrilled that the 2023 recipient of the Foster Medal, retired U.S. Navy Admiral Richard W. Mies, also contributed his award ($25K) to the Foster Fund endowment campaign. In his own words, "the Foster Medal is gift enough. I wanted to honor and follow Mim's leadership of using the award funds to honor Johnny's legacy."

About the John S. Foster Jr. Undergraduate Fellowship

The fellowship enables rising undergraduate seniors to contribute to projects vital to the nation's security and prosperity. Open to students in a myriad of fields, the opportunity recognizes individuals with demonstrated academic excellence who seek to apply that knowledge, much like Dr. Foster did, to problems of national importance. LLF's first Foster Fellow, Thomas Scott, is studying Mechanical Engineering at the University of Tennessee, Knoxville.

> *"LLF's John S. Foster Jr. Undergraduate Fellowship allowed me to learn from top scientists, take advantage of state-of-the-art computing resources, and work with modern computational solvers on interesting and challenging projects."* — **Thomas Scott**
>
> 2023 Inaugural Foster Fellow

Amplifying Science Solutions

Why LLF?

Innovation meets impact at the intersection of the **Livermore Lab Foundation** and the world-class science and technology at **Lawrence Livermore National Laboratory,** embodying the transformative power of science. Your investment fuels LLNL's groundbreaking research — with leading-edge experimental capabilities, unparalleled tools, dedicated researchers tackling today's greatest challenges and mentors aspiring scientists and engineers. At the Foundation, we enable public/private collaborations and leverage donor and foundation gifts to advance science and research initiatives, support a more diverse STEM workforce, and leverage the Lab's expertise for the greater good.

Why Now?

Today's multifaceted challenges require an all-hands-on-deck approach. Whether you are an everyday scientific thinker, an admirer of science, or a scientist yourself, you can help us advance scientific knowledge and support collective efforts to safeguard our future. Investing today is the key to ensuring great science and STEM leadership tomorrow and beyond!
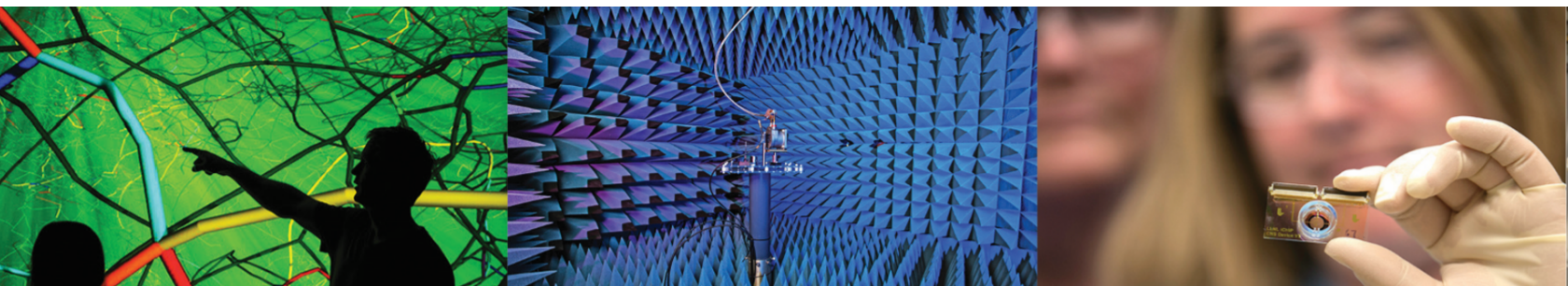
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GIVE TODAY

The Livermore Lab Foundation is honored to have earned top ratings from both Candid / Guidestar and Charity Navigator and is a proud member of CalNonprofits, acknowledging our commitment to industry best practices and transparency. These recognitions enable donors to give with confidence, assuring that their gifts contribute effectively to advancing our mission.

Platinum
Transparency
2024
Candid.

PROUD MEMBER OF
CalNonprofits
CALIFORNIA ASSOCIATION OF NONPROFITS

Charity
Navigator
★ FOUR-STAR ★

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Terry Damm
Financial Controller

Jesse Dupuis
Administrative Assistant

Susan Houghton
Climate Portfolio Manager

Emily Pezzutti
Marketing & Communications Consultant

Lori Taylor
Operations Consultant

Mission

Livermore Lab Foundation advances scientific
knowledge and inspires the next generation of
science and technology leaders by leveraging
philanthropic investments in world-class research,
education, and innovation at Lawrence Livermore
National Laboratory, a U.S. Department of Energy
national security laboratory.

*LLF Leadership outside our office at the
UC Livermore Collaboration Center*

livermorelabfoundation.org

925.453.9382
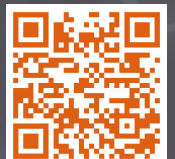
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Collaboration Center*

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