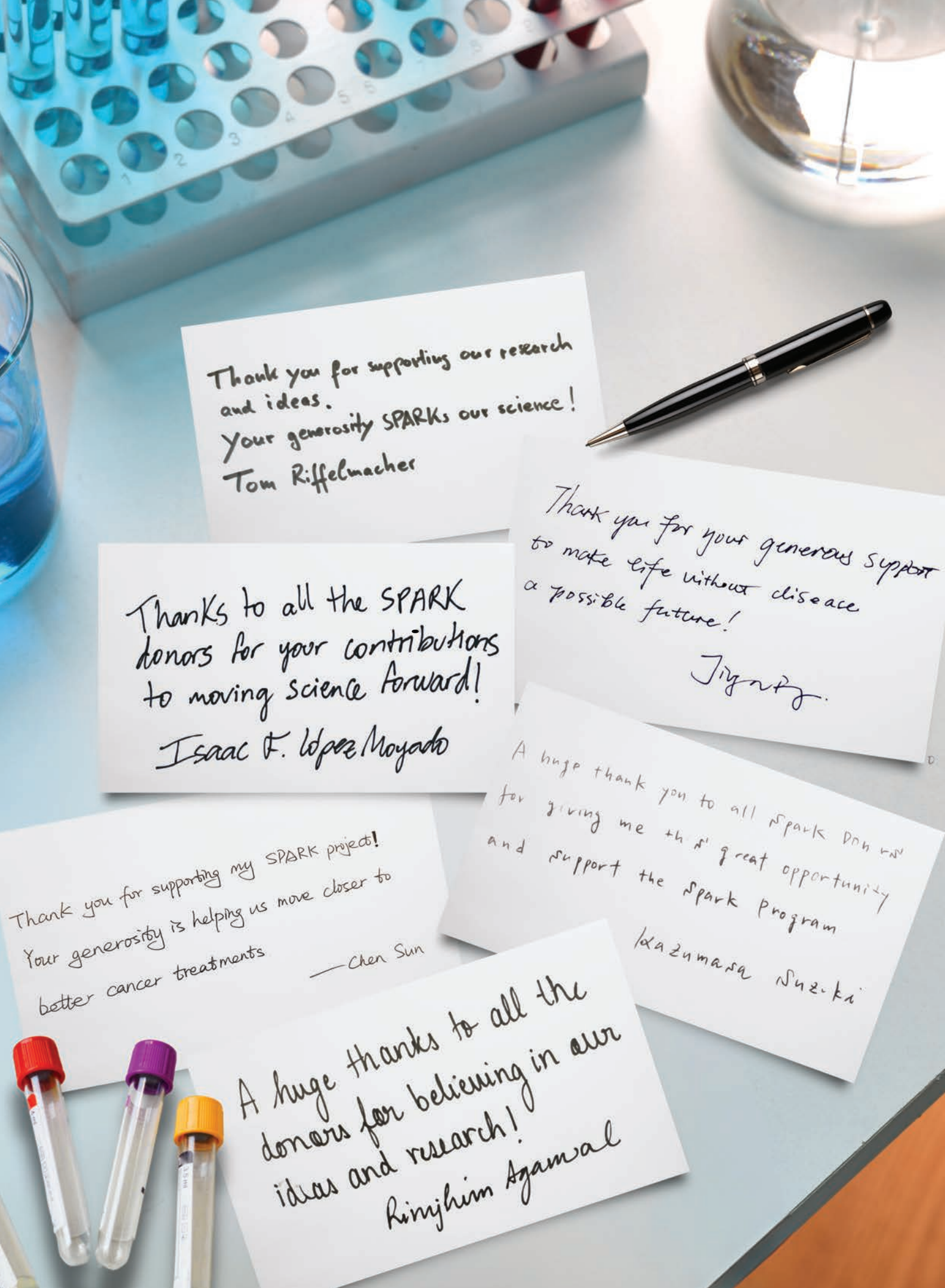
SPARK | THE TULLIE AND RICKEY FAMILIES SPARK AWARDS FOR INNOVATIONS IN IMMUNOLOGY

2025 // ANNUAL REPORT


Thank you for supporting our research and ideas.
Your generosity SPARKs our science!
Tom Riffelmacher
Thank you for your generous support to make life without disease a possible future!
Jignty.
Thanks to all the SPARK donors for your contributions to moving science forward!
Isaac F. Lopez Moyado
A huge thank you to all Spark Donors for giving me this great opportunity and support the Spark program
Kazumasa Suzuki
Thank you for supporting my SPARK project!
Your generosity is helping us move closer to better cancer treatments
—Chen Sun
A huge thanks to all the donors for believing in our ideas and research!
Rinjhim Agarwal

BRIGHTER, BOLDER, BIGGER:

SPARK's mission to fuel breakthroughs in immunology

How do you keep a program that uplifts the next generation of researchers dynamic and aligned with the ever-evolving scientific landscape?

You listen—to its stakeholders, its supporters, and its scientists. You imagine the possibilities that arise from a catalytic initiative like the Tullie and Rickey Families SPARK Awards for Innovations in Immunology: a program that seeds early-career immunologists with the resources they need to take risks, pursue bold ideas, and build careers in a rapidly changing research ecosystem.

Since its launch in 2017, SPARK has been more than a funding mechanism. It has been a statement of belief in the power of new voices in science. As federal research dollars become increasingly competitive, especially for emerging scientists, it is more critical than ever to invest in early-career researchers.

After eight years of success, and careful reflection with our donors, alumni, and Institute leadership, SPARK is evolving to meet this moment. **Beginning in 2026, each SPARK Award will be $30,000, marking the program's first funding boost since its inception.** This increase ensures that selected projects remain ambitious and feasible, while preserving the program's grassroots spirit and accessibility for a wide range of donors.

This evolution strengthens SPARK's ability to attract diverse, high-potential applicants and empowers LJI's early-career scientists to generate the preliminary data necessary to unlock larger grants. While the federal government has historically been a major source of medical research funding, many SPARK winners are now also finding their next stage of funding through additional sources—including disease-focused foundations, private donors, and companies seeking out bold, high-risk projects with translational potential.

These diverse funding avenues reflect an important shift in the research landscape. It is vital that LJI, as an institution, continues to support this change by being intentional in how we nurture young scientists. SPARK is more than seed funding. It is a signal that the ideas of young scientists matter, that there are multiple paths forward, and that their work deserves support from a wide range of partners.

To further align with institutional priorities and federal funding cycles, the SPARK program timeline will also shift to an earlier point in the year beginning in 2026. This adjustment will enhance both the program's efficiency and its strategic impact.

The Tullie and Rickey Families SPARK Awards continues to be a beacon of support for bold, transformative science. We are deeply grateful to our donors, reviewers, volunteers, and scientists who make this work possible, creating a vital cycle of innovation that can ultimately translate into real-world medical breakthroughs.

How the Tullie and Rickey families helped *build a path for bold science*

Brilliant ideas alone don't lead to breakthroughs. For many early-career scientists, the biggest challenge isn't a lack of imagination—it's a lack of opportunity. Without access to early funding and support, even the most promising immunology research can stall before it ever begins.

At La Jolla Institute for Immunology (LJI), that story began to change with the launch of the SPARK Awards. The program was designed to equip emerging scientists with the resources, mentorship, and visibility needed to bring high-risk, high-reward projects to life.

This vision became reality thanks in large part to the generosity and long-term commitment of LJI Board Director Tom Tullie, MBA, and his wife Judy, along with Board Director Dave Rickey and his wife Brenda. Their belief in the power of early investment has been instrumental in SPARK's growth and impact. In 2019, LJI renamed the initiative The Tullie and Rickey Families SPARK Awards for Innovations in Immunology to honor their dedication to the program.

Tom Tullie was among the first to review SPARK pitch presentations in 2018, and the experience left a lasting impression. Inspired by the energy and ideas of LJI's young scientists, he brought his entire family into the fold. Since then, Tom, Judy, and their daughters—Jacqueline, Anna, and Samantha—have all taken part in the pitch review process.

Left to right: Tom and Judy Tullie, Brenda and Dave Rickey

At a recent SPARK reception, Tom offered a toast that captured the heart of the program. Speaking to current SPARK winners, alumni, supporters, and donors, he shared,

> *"We know we don't have the resources to provide every young immunologist with a long-term position here. But what we can do is train them—so they take what they've learned at LJI, our mission, our spirit of collaboration, and our commitment to discovery, and spread that across the world. Our vision isn't just about La Jolla, it's about creating life without disease everywhere."*

For the Rickey family, supporting SPARK was a natural extension of their belief in LJI's mission. "Brenda and I love the idea of 'life without disease' because so many of our friends and family have suffered or died from cancer, heart problems, dementia, and other ailments," says Dave. "The Institute's mission is concise while being extremely bold and ambitious. It may not be fully realized in our lifetime, but we believe with the amazing talent of their scientists, the Institute's mission is achievable."

SPARK

THE TULLIE AND RICKEY FAMILIES SPARK AWARDS FOR INNOVATIONS IN IMMUNOLOGY

We are proud to share the **2025 Annual Report for the Tullie and Rickey Families SPARK Awards for Innovations in Immunology**—a year that celebrated bold ideas, fearless scientists, and the donors who make their work possible.

In this report, we share the final progress of the 2024 SPARK Awards recipients: a remarkable group of early-career researchers whose innovative projects are expanding our understanding of the immune system.

As you read on, you will be introduced to this year's SPARK Progress Pitch winner, an outstanding immunologist whose project exemplifies the kind of high-impact research the program was created to support. You will also find an updated timeline highlighting key milestones in the SPARK Awards' ongoing growth and evolution.

This year's report also features several SPARK alumni—our SPARK Stars—whose achievements beyond their award year continue to shape the future of immunology. In addition, we are pleased to highlight a meaningful new addition to the program, made possible by a generous pledge from The Joe W. and Dorothy Dorsett Brown Foundation.

None of this progress would be possible without you—our community of supporters. Your generosity fuels the curiosity, drive, and discoveries of each SPARK cohort. Your belief in their potential can help turn bold ideas into research that may one day save lives.

SHORT ON TIME?

Skip to the **"SPARK" Notes** section beneath each 2024 winner's headshot for a quick snapshot of their progress and key program highlights.

SPARK SUPPORT

The Tullie and Rickey Families SPARK Awards program offers donors a chance to significantly impact the careers of young researchers and help ignite the next big breakthroughs in medical research.

You can donate online at **lji.org/SPARK-giving**, or to discuss a range of giving opportunities, contact:

Sierra Felt-Morales
SPARK Program Manager
858-752-6667

Rimjhim Agarwal

FUNDED / January 2024

FUNDED BY / The generosity of the Rosemary Kraemer Raitt Foundation Trust

Does chronic chikungunya infection resemble an autoimmune disease?

"SPARK" Notes

Chikungunya virus can cause a brief, flu-like illness. But this virus can also lead to chronic, debilitating joint pain. SPARK winner Rimjhim Agarwal investigated how specialized T helper cells may drive these arthritis-like symptoms. This SPARK project has led to a better understanding of how the body responds to chikungunya virus and inspired ongoing research to learn why some immune responses blur the lines between infectious disease and autoimmune disease symptoms. Agarwal's insights may be key to developing more effective vaccines and therapies for chikungunya virus disease.

What was the goal of your SPARK project?

Chikungunya virus (CHIKV) is a mosquito-borne pathogen that has been reported in more than 110 countries. We need to understand why so many people infected with CHIKV develop chronic, arthritis-like disease. This mysterious disease resembles an autoimmune disease and leads to severe joint pain and tissue damage.

Using patient samples, I examined whether T helper cells, a type of immune cell, may trigger joint pain by mistakenly attacking a person's own cells instead of targeting CHIKV. **My goal was to deepen our understanding of long-lasting effects of CHIKV infection and contribute to the development of new therapeutics.**

SPARK Project Results

I used bioinformatics tools to identify 15 self-antigens (sites on healthy cells) with high sequence similarity to CHIKV antigens (sites on the virus). I then stimulated T helper cells from chronic CHIKV patients with these self-antigens. My goal was to test if these virus-fighting T helper cells would cross-react to markers from healthy cells. I found no immune response, suggesting that the patients' T helper cells were not cross-reactive; however, this finding doesn't rule out the possibility that T helper cells are mistaking healthy cells for viral targets.

My research also revealed which molecular sites on CHIKV trigger the strongest T cell responses. Understanding this T cell "avidity" may prove important for future investigations into the roles of T cells during CHIKV infection.

SPARK IMPACT STATEMENT

"The SPARK program has provided an invaluable experience for me. I improved my communication and research skills and learned to budget for a project, which as a trainee, you often don't get to do. I will use the communication and research skills I have learned through this program as I prepare for future speaking engagements and apply for funding."

What's next for this project?

I am excited to follow up on my SPARK project by studying CHIKV-specific CD4+ T cells in greater depth. I plan to use high-throughput transcriptomic tools and TCR analysis to learn more about how these cells target CHIKV antigens. I can then compare CD4+ T cells from individuals with chronic CHIKV disease with cells from individuals who have recovered after CHIKV infection. This work may shed light on how specific T cell subsets lead to chronic, arthritis-like symptoms.

CHIKV is not the only virus that can trigger chronic, arthritis-like disease. I also plan to study T helper cell cross-reactivity with other viruses, such as cytomegalovirus and Epstein-Barr virus.

What's next for Rimjhim?

My goal is to successfully finish my Ph.D. and potentially pursue a career in academia post graduation. I really enjoy studying host-viral interactions and hope to continue that in the future. Currently as a Ph.D. student, I am hoping to defend my thesis work in the next two years and apply for postdoctoral positions in the field of infectious diseases. I have two manuscripts under review which is a major milestone in my Ph.D. journey. I am really excited to see how my thesis project advances in the coming years!

Jingru Fang, Ph.D.

FUNDED / January 2024

FUNDED BY / The generosity of LJI Board Director Sandor Shapery and Rebecca Shapery

How do bats tolerate viral infections that are otherwise fatal in humans?

"SPARK" Notes

Ebola virus is just one bat-associated virus that is deadly in humans but harmless in bats. Part of the reason why Ebola infection can be so devastating has been linked to inflammation driven by the body's aberrant immune responses. To understand the mechanism of how Ebola virus dysregulates inflammation, and how bats protect themselves from such viral damage, we need to zoom into a single cell and watch how Ebola virus rewires the human genetic circuits responsible for host metabolism and inflammation. SPARK winner Jingru Fang, Ph.D., discovered a new mode of host-virus interaction and opened the door to comparing human and bat immune responses to deadly viral pathogens.

What was the goal of your SPARK project?

I want to understand how bats carry some of the world's most deadly viruses, such as Ebola virus, without getting sick. There is reason to think structures called "viral factories" may hold the answer.

Ebola virus-infected cells look strange under the microscope. We can see that infected cells are dotted with large granules. These granules are "viral factories," pockets of viral proteins that carve out space to replicate inside host cells. Viruses may also use viral factories to manipulate host cell defenses. **I set out to use RNA imaging techniques and a cutting-edge spatial-transcriptomic method called MERFISH to study how Ebola viral factories select and traffic host cellular mRNAs to manipulate host metabolism and immune responses.**

SPARK Project Results

My preliminary experiments in both human and bat cells suggest that Ebola virus uses viral factories to trap molecules called cellular mRNAs. This motivated my proposal to uncover the biological identity of trapped cellular mRNA to understand the consequence of this process. I applied a spatial-transcriptomic method called MERFISH (multiplex error robust fluorescence in situ hybridization) in collaboration with Dr. Gene Yeo's group at UC San Diego to quantify the subcellular redistribution of over one hundred cellular mRNAs in Ebola viral factories within human kidney cells under normal versus IFN-stimulated conditions.

I found that viral factories can enhance the stability of selective cellular mRNA with distinct molecular features, especially for mRNAs encoded by IFN-stimulated genes. As inflammation-related mRNAs are kept longer than they should be in cells, this will lead to unwanted systemic inflammation and pathological damage seen in Ebola virus disease.

SPARK IMPACT STATEMENT

"This SPARK award gave me tremendous support to pursue an original, but risky idea. There are fascinating technologies emerging everyday in the academic world, which enable novel discoveries that cannot be made otherwise. SPARK support allowed me to apply one of these technologies to investigate a hidden side of our immune response to viral infection."

What's next for this project?

The discovery that Ebola virus traps and enhances the stability of immune-related mRNA in viral factories is totally unexpected. This finding provides a mechanistic foundation for using type 1 IFN to resolve disease symptoms induced by Ebola virus infection. Going forward, I plan to investigate whether Ebola viral factories have a similar effect on immune-related mRNAs in bat kidney cells. I am finalizing my SPARK project with additional experiments and plan to submit my manuscript in two months for peer-review and publication.

What's next for Jingru?

I am currently at Princeton University for my postdoctoral research training. My research combines molecular virology and quantitative biophysics to establish a link between biophysical principles of viral factories and their biological functions in viral diseases.

My goal is to apply this knowledge to uncover how a host's physiological features (e.g. body temperature) and genetic features shape viral infection, tropism, and evolution in different host species. My long-term goal is to build my own research lab and to train the next generation of scientists who are interested in my research area.

Isaac López-Moyado, Ph.D.

FUNDED / January 2024

FUNDED BY / The generosity of LJI Board Director Tom Tullie and the Tullie Family

Can we take advantage of a vulnerability in cancer cells to preferentially kill them?

"SPARK" Notes

There's a hidden vulnerability inside cancer cells. As cancer cells spread, they accumulate harmful genetic material called RNA-DNA hybrids. Too many hybrids will kill a cell. SPARK winner Isaac López-Moyado, Ph.D., explored whether scientists can actually increase these hybrids to preferentially kill cancer cells. Dr. López-Moyado worked with a mouse model of acute myeloid leukemia and used CRISPR gene-editing techniques to accelerate the build up of RNA-DNA hybrids. Amazingly, his approach halted cancer growth within six days. This research may lead to new strategies to better target and kill cancer cells.

What was the goal of your SPARK project?

We desperately need more therapeutic options for treating bone marrow cancers and blood cancers, such as acute myeloid leukemia. **My goal was to see if I could turn a feature of cancer cells into a fatal flaw.** Cancer cells form RNA-DNA hybrids during gene expression. Normally, a cell's RNase H enzymes step in to prevent hybrid buildup. I aimed to block these enzymes and force cancer cells to accumulate RNA-DNA hybrids. I began by using bone marrow cells from a mouse model of acute myeloid leukemia. I found higher levels of RNA-DNA hybrids in these cancer cells. I then used CRISPR gene-editing techniques to delete RNase H genes and further increased these hybrids, with lethal consequences to cancer cells.

SPARK Project Results

Increasing RNA-DNA hybrids caused cancer cells to stop growing within six days. When I studied why the cells stopped growing, I found that cancer cells without RNase H enzymes showed more DNA breaks. These DNA breaks are a sign that RNA-DNA hybrids are causing DNA damage—which spells trouble for a cancer cell.

Mapping these DNA breaks revealed they occurred at sites called "genomic enhancers." These sites control gene expression. Without normal genomic enhancers, a cell cannot make the proteins it needs to function. The result? Cancer cell death. I discovered that increasing RNA-DNA hybrids in cancer cells even extended survival in a mouse model of acute myeloid leukemia. This discovery gives me hope that future cancer treatments could take advantage of RNA-DNA hybrids to kill cancer cells.

SPARK IMPACT STATEMENT

"SPARK really taught me how to execute my research based on a budget, gave me freedom to choose my line of research, and helped me build overall leadership skills that will be necessary as an independent faculty member."

What's next for this project?

We need to study how this approach would work as an actual drug therapy. Going forward, I am working with a mouse model and with cancer cells to test two drugs that inhibit RNase H enzymes. I am interested in examining how these drugs might work in combination with other existing therapeutic approaches.

SPARK funding was fundamental for launching this research direction, and I expect that follow-up research will advance our understanding of RNA-DNA hybrids as a therapeutic vulnerability in many different types of cancer, including solid tumors such as BRCA1-mutant breast cancer.

What's next for Isaac?

I am currently finishing experiments to get this project ready for publication in a peer-reviewed journal. Additionally, I have applied for funding to continue this work, and I am pleased to announce that I was recently honored with the EvansMDS Young Investigator Award for research into myelodysplastic syndrome, a group of bone marrow cancers. This funding will support me in carrying on this project and establishing my own laboratory in the coming years.

Chen Sun, Ph.D.

FUNDED / January 2024

FUNDED BY / The generosity of various donors

Can we design better receptors for CAR-T cell therapy?

"SPARK" Notes

Multiple myeloma is the second most common blood cancer, and while treatments have improved, a cure remains elusive. Since 2021, therapies developed with engineered immune cells, called CAR T cell therapies, have improved patient outcomes. SPARK winner Chen Sun, Ph.D., used a high-resolution imaging technique called cryo-electron tomography (cryo-ET) to examine exactly how CAR T cells interact with cancer cells. Thanks to SPARK support, Dr. Sun captured the first-ever 3D image of the connection between CAR T cells and cancer cells. This new view suggests ways we might enhance CAR T therapies to improve multiple myeloma treatments and patient outcomes.

What was the goal of your SPARK project?

My goal was to study two types of CAR T cells, Ide-cel and Cilta-cel, both of which are FDA-approved treatments for a blood cancer called multiple myeloma. These CAR T cell therapies are not equally effective, and we need to know why. My initial experiments showed that Cilta-cel binds to cancer cells faster than Ide-cel, which matches clinical data indicating Cilta-cel's superior performance. Cilta-cel is also more effective even at lower doses. For my SPARK project, I harnessed cryo-ET to analyze how CAR T cells target cancer cells. I hoped to reveal why Cilta-cel works better—and guide the development of more effective CAR T therapies.

SPARK Project Results

My research produced the first-ever 3D tomogram of the immune synapse formed between a CAR T cell and a target cell in a native cellular environment. With this high-resolution image, I identified features on the CAR T side which appear to be immune cell structures called lytic granules. Lytic granules release cancer-killing molecules. My 3D tomogram captures what is likely the late stage of a lytic granule being released into the cell-to-cell interface to kill a cancer cell.

These findings have significant clinical potential. We can now see exactly how CAR T cells target cancer cells. This approach may reveal why some CAR T cell therapies are more effective than others—a vital step towards refining these therapies and bringing more effective options to patients with relapsed multiple myeloma.

SPARK IMPACT STATEMENT

"The SPARK Award has provided me with invaluable public exposure and a deeper understanding of how scientific discoveries can directly impact patient lives. It has given me the confidence to pursue high-risk, high-reward projects. The personal connection I've made with donors, like Joani Nelson who shared her passion for blue penguins with me, has also been incredibly meaningful and inspiring. My experience with SPARK has strengthened my ability to translate scientific discoveries into real-world applications, which I plan to incorporate into my future research."

What's next for this project?

I plan to expand on these findings by investigating how structural differences in CAR T cell synapses contribute to treatment outcomes for patients with various hematologic malignancies, including blood cancers such as leukemias and lymphomas.

This work may help scientists better understand a phenomenon called T cell exhaustion, where T cells fail to effectively eliminate tumors. Additionally, future research will integrate our structural discoveries to shed light on how CAR T cell therapies work in specific patient groups, ensuring that more individuals can benefit from these potentially life-saving treatments.

What's next for Chen?

Next, I plan to characterize well-established protein markers of the canonical TCR immune synapse to assess the extent to which the CAR T cell immune synapse mirrors its organization. My goal is to identify a reliable protein marker that defines the boundary of the CAR T cell immune synapse, which could serve as a quantitative metric for evaluating CAR T cell quality.

Kazumasa Suzuki, M.D., Ph.D.

FUNDED / January 2024

FUNDED BY / The generosity of LJI Board Director Barbara Donnell, Bill Passey and Maria Silva, and various donors

How do regulatory T cells become corrupted to drive autoimmune disease?

"SPARK" Notes

An estimated 15 million Americans have been diagnosed with an autoimmune disease. To help these patients, scientists need to understand why some immune cells contribute to harmful inflammation. SPARK winner Kazumasa Suzuki, M.D., Ph.D., took a close look at specialized immune cells called regulatory T cells (Treg cells), which normally help control inflammation and autoimmune disease. Dr. Suzuki's research shows how harmful genetic material can "corrupt" Treg cells and suggests that blocking this process could keep helpful Treg cells on the right track.

What was the goal of your SPARK project?

Inflammation is a devastating force in autoimmune disease. Normally, a protein called Foxp3 allows Treg cells to jump in and suppress inflammation. Unfortunately, Treg cells sometimes lose Foxp3 and transform into ex-Treg cells, which can drive inflammation. **For my SPARK project, I explored why the loss of Foxp3 leads to this Treg cell "corruption."** I investigated the role of genetic material called transposable elements (TEs). TEs were once considered "junk" DNA, but TEs are now recognized for their roles in inflammation and cancer. I used single-cell sequencing and gene editing techniques to test my hypothesis that without Foxp3, TEs increase and Tregs become inflammatory ex-Tregs.

SPARK Project Results

I found that Foxp3 binds near TE sequences on DNA, regulating their expression. I then used gene editing techniques to decrease Foxp3 stability in a mouse model.

My experiment showed that loss of Foxp3 pushes Treg cells to spontaneously convert to ex-Treg cells, which secrete inflammatory substances and have higher levels of TEs.

We may be able to halt this corruption. My work so far shows that reintroducing Foxp3 has a direct role in suppressing TEs. I believe targeting ex-Treg cells may prevent Tregs from becoming harmful, which could lead to new autoimmune disease treatments.

SPARK IMPACT STATEMENT

"The SPARK program was critical for launching this research direction. And more than that, making connections with SPARK donors has been an unforgettable experience for me. This was a very precious opportunity to see our research through the eyes of donors and the public."

What's next for this project?

My next step is to determine exactly how higher levels of TE expression trigger inflammation. Researchers have found that Treg cells have several sensors that can detect TEs, so I will study which TE sensor is linked to pro-inflammatory activity. Once I pinpoint which sensor molecules are most important, I can test new ways to inhibit TE sensing and hopefully block pro-inflammatory signals in Treg cells.

Going forward, I will test drugs and gene editing to suppress TEs and reduce inflammation—as I aim to develop innovative autoimmune disease therapies such as systemic lupus erythematosus or rheumatoid arthritis.

What's next for Kazumasa?

The data and findings from my SPARK project have contributed several review articles and peer-reviewed papers. The experience of presenting my SPARK proposal was also a good opportunity for me to think about how to approach lay people. These accomplishments will be very helpful for me in the next stage of my career. I plan to stay at LJI for several years to continue my research before seeking a position in academia or the biomedical industry.

Thomas Riffelmacher, Ph.D.

FUNDED / January 2024

FUNDED BY / The generosity of LJI Board Director Dave Rickey and the Rickey Family

Are fat-addicted MAIT cells driving liver disease?

"SPARK" Notes

Fatty liver disease is a potentially deadly disease that affects one in four Americans. While many factors—such as lifestyle, diet, and even small amounts of alcohol—can trigger this liver disorder, it's still unclear why some individuals progress rapidly toward severe liver conditions, such as steatosis or liver cancer, while others remain unaffected. SPARK winner Thomas Riffelmacher, Ph.D., studied whether a special group of immune cells, called mucosal associated invariant T (MAIT) cells, drive fatty liver disease. Dr. Riffelmacher's work sheds light on the inner workings of MAIT cells and their role in liver health.

What was the goal of your SPARK project?

Immune cells use molecules called cytokines to communicate with each other. Cytokines can drive immune cell behavior, and certain cytokines are linked to disease progression. Scientists have found that a cytokine called IL-17 may play a role in fatty liver disease progression. **My goal was to learn more about the immune cells that produce IL-17 in the liver**. I had previously found a subset of MAIT cells that produces high levels of IL-17 in the lung. For my SPARK project, I isolated MAIT cells from people with and without liver disease or metabolic syndrome (a disease driven by fat accumulation) to understand MAIT cell function and IL-17 production in the liver.

SPARK Project Results

I set up a system to isolate pure MAIT cell populations from patients, and I analyzed how the cells responded under various conditions, including how these cells used glucose versus fatty acids.

By uncovering how MAIT cells used different nutrient metabolites, I could compare their behavior to different immune cells and study how MAIT cell behavior might change in fat-driven disease states. I also examined markers on the MAIT cell surface and measured IL-17 production under different conditions. This allowed me to determine how metabolic factors may activate certain pathways in MAIT cells and trigger changes that could drive disease.

These findings bring us closer to finding targets to stabilize or repair liver tissue, potentially leading to new treatments for fatty liver disease.

SPARK
IMPACT
STATEMENT

"I want to sincerely thank all the donors who made this possible. I am deeply thankful for the opportunity to continue investigating these important questions and to build on the promising preliminary data we generated thanks to earlier SPARK support."

What's next for Thomas?

I have accepted a professorship position at the University of Cologne in Germany. This new role represents a significant step forward in my academic and professional journey. My family and I will be relocating to Germany this summer, and I look forward to continuing and expanding this line of work.

2024 Progress Pitch Competition and *Winner Progress*

Recognizing and advancing promising research

The 2024 Tullie and Rickey Families SPARK Awards winners had the unique opportunity to compete for an additional $25,000 SPARK award to further their research.

This event, known as the Progress Pitches, provides an extra boost to some of the most promising SPARK-funded projects. The goal is to help scientists maintain their momentum in establishing proof-of-concept data and prevent potential funding gaps. During the Progress Pitches, each scientist presented the advancements made with their initial SPARK Award and proposed a continued line of research.

A panel of SPARK program stakeholders and LJI Board Members reviewed the presentations and selected this year's winner, Dr. Thomas Riffelmacher.

> "Winning this additional SPARK progress funding for my research on unconventional T cells in metabolic dysfunction-associated diseases is a significant honor, made possible by the generosity of the donors. My research direction ***highlights the vital connection between nutrition, metabolism, and inflammatory immune responses***, particularly how T cell responses impact these diseases. I am deeply thankful for the support that allows me to continue researching these questions."

Dr. Thomas Riffelmacher

What's next for this project?

In the first phase of my SPARK project, we were able to generate for the first time a metabolomics dataset of human MAIT cells, which identified an alteration in amino acid utilization in a particular subset. In this next phase, we will follow up on this with additional experiments to measure amino acid metabolism in healthy individuals vs patients with fatty liver disease. My aim is to uncover specific drivers of metabolic dysbiosis (an imbalance in the gut microbiome) and how this condition is linked to MAIT cell function and cytokine production.

I am also looking beyond IL-17 to understand how MAIT cells regulate a range of other key cytokines. I'm curious whether we can alter the metabolic choices of MAIT cells to reshape their effector cytokine profiles. I'm also planning to test how pharmacologic and CRISPR-based genetic modification of metabolic genes affect MAIT cell function.

The ultimate goal is to find metabolic dependencies of MAIT cells, which will allow us to prevent their inflammatory reprogramming in metabolic disease.

SPARK Program Timeline

Securing and executing a ***SPARK Award*** involves a multi-year process, spanning across two calendar years. The timeline below reflects the updated SPARK Program Timeline for the next cohort of finalists and winners.

YEAR ONE: APPLICATION PHASE

REQUESTS FOR PROPOSALS / SPRING
Postdoctoral fellows, graduate students, and research technicians are encouraged to apply.

SPRING — **APPLICATION DEADLINE** /
The window for submissions closes.

APPLICATION REVIEW / SPRING
LJI leadership, faculty, and members of the Tullie and Rickey families select the SPARK finalists.

SUMMER — **FINALISTS TRAINING** /
The finalists receive training in project communication through writing, video production, and networking.

FUNDRAISING CAMPAIGN / SUMMER - FALL
The number of SPARK awards given will depend on the funds raised through this campaign.

FALL — **PITCH EVENT** /
Finalists present their projects in 15-minute sessions to a review panel. The panel ranks each presentation to decide who will receive a SPARK award.

BROWN FOUNDATION REIGNITE ROUND / FALL
Finalists who are not selected during the initial pitch will have the chance to refine their proposals using expert feedback and present them again in a dedicated follow-up pitch session.

WINTER — **WINNERS ANNOUNCEMENT** /
The Tullie and Rickey Families SPARK Awards recipients are announced.

YEAR TWO: PROJECT EXECUTION PHASE

WINTER — **GRANT MANAGEMENT TRAINING** /
Awardees receive training to manage their $30,000 grant budgets effectively.

SPARK AWARDS CELEBRATION / WINTER
This celebration honors SPARK winners and connects them with donors.

SUMMER — **PROGRESS REPORTS** /
Progress reports are submitted for inclusion in that year's *SPARK Annual Report*.

PROGRESS PITCH / FALL
The current award cohort will have the opportunity to pitch for an additional $30,000 to continue their projects, helping them maintain momentum in establishing proof-of-concept data and avoid funding gaps. One winner is selected.

FALL — **PROJECT COMPLETION** /
Final reports are submitted for inclusion in the following year's *SPARK Annual Report*.

Although the application and execution of SPARK projects span two years, many of these projects have ***long-lasting effects***, continuing to ***influence research and shape scientists' careers*** for years to come.

2025 SPARK Awards Celebration

On February 4, 2025, LJI welcomed supporters, scientists, and alumni for an evening *celebrating eight years* of the Tullie and Rickey Families SPARK Awards for Innovations in Immunology.

The event honored the six newest SPARK awardees and reflected on how far the program has come since its launch. Hosted in the Institute's seminar room and atrium, the evening celebrated generosity, innovation, and progress. President and CEO Erica Ollmann Saphire, Ph.D., MBA, welcomed guests and set the tone for the evening before introducing 2021 SPARK awardee and LJI Instructor Dr. Annie Elong Ngono, who shared how the award propelled her infectious disease research forward.

The event also featured a white coat ceremony for the 2025 SPARK cohort, marking the beginning of their SPARK research journey. The evening concluded with a toast from LJI Board Director and program co-benefactor Tom Tullie, MBA, who shared his vision for the program's future and the powerful ripple effect of supporting bold, early-stage science.

Left to right: Richard Gibson, Jill Davis-Prickett, Barbara Takahashi, and Sam Takahashi

Left to right: Tom Tullie, MBA, Laura Hinojosa, and Judy Tullie

Left to right: David Anderson, Diane Aston, and Al Aston

Left to right: Jim Hazel, Tanya Shaffer, Kelly Shaffer, and Katya Hazel

Left to right: Tom Tullie, MBA, alongside 2025 SPARK winners Kelly Shaffer, Amparo Martínez Pérez, Ph.D., Laura Hinojosa, Gele Niemeyer, Hsueh-Han "Dupon" Lu, Nirmalya Dasgupta, Ph.D., as well as Judy Tullie

Left to right, back to front: Erik Ehinger, Ph.D., Kelly Shaffer, Laura Hinojosa, Hsueh-Han "Dupon" Lu, LJI President & CEO Erica Ollmann Saphire, Ph.D., MBA, LJI Vice President of Advancement Kelsey Dale, CFRE, CSPG, Abhijit Chakraborty, Ph.D., SPARK Program Manager Sierra Felt-Morales, Tom Tullie, MBA, Amparo Martínez Pérez, Ph.D., Gele Niemeyer, Nirmalya Dasgupta, Ph.D., Judy Tullie, Annie Elong Ngono, Ph.D., Maria Inês Matias, Ph.D., Barbara Donnell, MA, Rimjhim Agarwal, Daniela Weiskopf, Ph.D., Sara McArdle, Ph.D., Julie Burel, Ph.D., Chen Sun, Ph.D., and Kazumasa Suzuki, M.D., Ph.D.

Guests gather in the Institute's Ishizaka Seminar Room to celebrate the 2025 SPARK Awards winners and eight years of groundbreaking innovation.

Thank you, reviewers!

We are deeply grateful to the application and pitch reviewers who generously dedicated their time and expertise to the 2025 Tullie and Rickey Families SPARK Awards for Innovations in Immunology:

Kelsey Dale, CFRE, CSPG

Barbara Donnell, MA

Tal Einav, Ph.D.

Brandon Fabritzky, MBA, CRA

David Hall, CSP

Gina Kirchweger, Ph.D.

Ken Magid, J.D.

Robert Mahley, M.D., Ph.D.

Margaret Ng Thow Hing, J.D.

Miguel Reina-Campos, Ph.D.

David M. Rickey

Peter St. Clair

Raydene St. Clair

Tom Tullie, MBA

David Webb, Ph.D.

SPARK Stars

The Tullie and Rickey Families SPARK Awards program not only provides seed funding for innovative ideas but also focuses on training and supporting the most promising early-career scientists.

Throughout the past year, we celebrated the successes of our "SPARK Stars," previous SPARK Awards recipients who have achieved remarkable milestones. Their accomplishments show how philanthropic support of the SPARK program fuels discovery and helps develop the next generation of researchers. If you missed any of the updates, here are a few highlights:

Post-award scientific breakthroughs

Daniela Weiskopf, Ph.D., and Rosa Isela Gálvez, Ph.D.

2018 SPARK Awards Winner and 2023 SPARK Awards Winner

In February 2025, Daniela Weiskopf, Ph.D., celebrated a major milestone with the publication of her first paper as sole Principal Investigator in her new lab. Accepted by *JCI Insight*, the study—titled *Frequency of dengue virus–specific T cells is related to infection outcome in endemic setting*—examines T cell responses in children who experience repeated dengue virus infections. The paper's first author, Rosa Isela Gálvez, Ph.D., is also a SPARK alumna, marking a proud moment for two generations of SPARK scientists advancing impactful immunology research.

Gurupreet Sethi, Ph.D.

2022 SPARK Awards Winner and 2023 Progress Pitch Winner

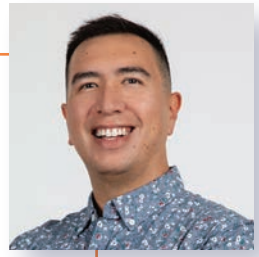
LJI Instructor Gurupreet Sethi, Ph.D., led a study published in the *Journal of Allergy and Clinical Immunology* that investigates a promising new approach to asthma treatment. While current therapies often fall short—leaving some patients vulnerable to severe attacks—Dr. Sethi's strategy offers potential for long-lasting relief and may also help reduce broader immune inflammation. (Scan the QR code to learn more.)

Felix Nettersheim, M.D.

2023 SPARK Awards Winner and 2024 Progress Pitch Winner

In November 2024, Felix Nettersheim, M.D., published a manuscript in *Nature Immunology* titled, *PD-1 and CD73 on naive CD4+ T cells synergistically limit responses to self*. His findings provide key insights that could inform the development of vaccines designed to promote immune tolerance, as well as new approaches in cancer immunotherapy.

Securing prestigious follow-on funding



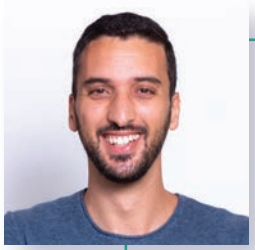
Isaac López-Moyado, Ph.D. *2024 SPARK Awards Winner*

In March 2025, Isaac López-Moyado, Ph.D., received the Edward P. Evans Foundation Young Investigator Award for his project titled, "Inhibition of RNase H Enzymes to Increase R-loops: A New Therapeutic Strategy for Myelodysplastic Syndromes." The award provides $150,000 per year for three years, totaling $450,000.

Jingru Fang, Ph.D. *2024 SPARK Awards Winner*

In July 2025, Jingru Fang, Ph.D., will share her SPARK project at the American Society for Virology annual meeting, backed by a competitive postdoctoral travel award. This honor allows her to highlight her research among top virologists and expand her professional network at a major scientific venue.

Advancing careers and expanding impact



Mehdi Benkahla, Ph.D. *2019 and 2021 SPARK Awards Winner*

In March 2025, Mehdi Benkahla, Ph.D., began a new chapter in his career, transitioning from LJI to serve as an Assistant Research Professor at City of Hope, a leading institution that provides patients, families, and communities across the United States with comprehensive cancer care.

Thomas Riffelmacher, Ph.D.

2020 and 2024 SPARK Awards Winner and 2025 Progress Pitch Winner

In June 2025, Thomas Riffelmacher, Ph.D., will begin his new role as the Walter and Maga Boll Professor of Cardio-Oncology in the Department of Medicine at the University of Cologne in Germany, where he will lead his own laboratory.

Rimjhim Agarwal *2024 SPARK Awards Winner*

Rimjhim Agarwal, a UC San Diego graduate student in the Weiskopf Lab, was invited to speak at a Major Symposium during the American Association of Immunologists' IMMUNOLOGY2024™ Annual Conference. Her selection as a featured presenter underscores the national recognition of her infectious disease research. (Scan the QR code to learn more.)

SPARK Donor Honor Roll

Philanthropy fuels the next generation of research

Thank you to all of the generous donors to the Tullie and Rickey Families SPARK Awards for Innovations in Immunology program. The donor list below includes all contributors to the Tullie and Rickey Families SPARK Awards program since its inception in Fall 2017 through April 2025. Any donor with a SPARK icon (✳) after their name denotes they've given enough cumulatively to fund at least one whole SPARK Award.

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The donor list above represents all donors to The Tullie and Rickey Families SPARK Awards for Innovations in Immunology as of April 30, 2025.

*In Memoriam

The Power of a Second Chance:
SPARK launches the Brown Foundation Reignite Round

The Tullie and Rickey Families SPARK Awards for Innovations in Immunology was launched to provide vital support for early-career scientists and to introduce an innovative model of research funding.

Building on that strong foundation, SPARK now includes a new pilot component: The Brown Foundation Reignite Round. Made possible by a generous three-year partnership with the Joe W. and Dorothy Dorsett Brown Foundation, this new initiative brings an important addition to the program—a second chance for finalists to pitch their projects for funding.

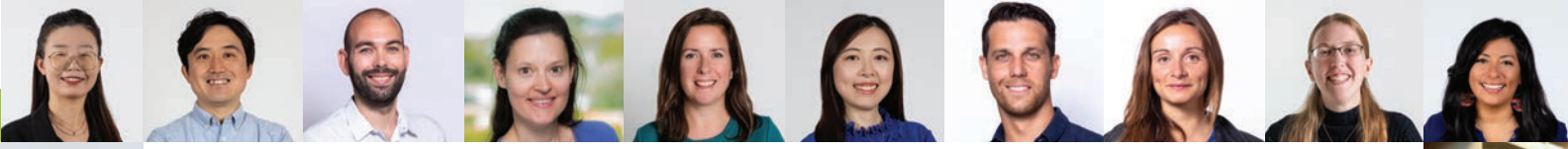
In previous years, SPARK has received more high-caliber proposals than it could support. Applicants who were not selected in the initial pitch round often had no avenue to re-enter the cycle, despite receiving valuable feedback. The Brown Foundation Reignite Round addresses this gap, offering select applicants who did not receive initial funding the chance to refine their proposals and return for a follow-up pitch session.

From this group, one researcher will be chosen as the **Brown Foundation SPARK Winner**, awarded $30,000 to advance their project, and invited to join the cohort of other SPARK Awards winners. E.F. Hunter, President of the Brown Foundation, expressed his excitement for the program: "LJI—along with the Tullie and Rickey families—has developed an incredible program to help early-career researchers. We are grateful to be invited to be a part of it."

The Reignite Round functions as an "accelerator within the accelerator." It is more than just a second chance; it is an opportunity for young scientists to embrace feedback, refine their ideas, and return with renewed strength. In fields like venture capital, academia, and biotech, breakthroughs are often the result of persistence and iteration, rather than success on the first try.

In addition to establishing the Brown Foundation Reignite Round, the Brown Foundation also provided three-year supplemental funding for the SPARK Pitch Bonus Award, which introduces an added layer of recognition and motivation by granting an additional $5,000 to the top-ranked winner of the initial SPARK pitch.

The Foundation also made a visionary and first-of-its-kind three-year philanthropic investment to support core programmatic SPARK operations, sustaining and strengthening the infrastructure behind the program's continued growth. We are deeply grateful for the Brown Foundation's multifaceted partnership and generous philanthropy, which continue to elevate and expand the impact of SPARK.



SPARK By The Numbers

1.65 Million Raised
by 252 donor families nationwide

53
Innovative Projects Funded
Over 8 years

33 Young Scientists Promoted

15 Independent Labs Established

$12.1+ Million in Follow-on Funding

*These numbers reflect the impact of The Tullie and Rickey Families SPARK Awards for Innovations in Immunology from its launch in Fall 2017 through May 2025.

In their words: The Transformative Power of SPARK

> "I highly recommend applying for the SPARK program. It is the perfect platform for budding scientists to test bold, fresh ideas—ones we might otherwise hesitate to pursue due to the risks involved. What makes SPARK truly unique is the unwavering support from our donors, who believe that the 'naïve' ideas of young researchers have the potential to revolutionize science. When they have the courage to invest in our bold hypotheses, we should have the confidence to take that leap."

2022 SPARK Awards Winner

> "One aspect of my experience with SPARK that I truly value is the training I received and the opportunity to communicate my research to a broader audience. While I work in an environment surrounded by scientists with similar expertise, which is crucial for specialized training, I recognize that to maximize the impact of my work and contribute to society, I need to effectively engage with a general audience. Being able to explain my research, listen to their questions, and address their concerns—especially in the context of human health and infectious disease prevention—has been invaluable."

2024 SPARK Awards Winner

SPARK

THE TULLIE AND RICKEY FAMILIES
SPARK AWARDS FOR
INNOVATIONS IN IMMUNOLOGY

La Jolla Institute for Immunology
9420 Athena Circle, La Jolla, CA 92037

For more information about The Tullie and Rickey Families SPARK Awards for Innovations in Immunology, please reach out to:

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