

# FUNDING RESEARCH WITH A PURPOSE



**THE LEGACY OF ANGELS FOUNDATION**  
2019 ANNUAL REPORT

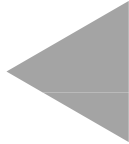


**The Legacy of Angels**  
FOUNDATION



# TABLE OF CONTENTS

<b>LETTER FROM THE CO-FOUNDER .....</b>	<b>3</b>
<b>ABOUT US .....</b>	<b>4</b>
<b>GRANTS FUNDED IN 2019 .....</b>	<b>5</b>
<b>OUR FOCUS AREAS .....</b>	<b>6</b>
Our Nation's Greatest Healthcare Program-Newborn Screening .....	7
Krabbe Disease: The Kirbo Family Story .....	8
Cystic Fibrosis: One Mother's Story .....	10
<b>THE FOUNDATION</b>	
Recipient of the Inaugural Sue Rosenau Legacy Award .....	11
Highlighting a Board Member: Brett Rosenau .....	12
2019 Programs Supported by TLOAF .....	13
<b>MEETINGS &amp; CONFERENCES</b>	
KTRN Meeting .....	14
2019 World Symposium .....	16
APHL .....	18
<b>FINANCIAL SUMMARY .....</b>	<b>19</b>



# FROM THE CO-FOUNDER

**As I reflect on 2019**, I realize one constant in our lives will always be change. We cannot avoid the unexpected events in our lives, and it is these events that challenge us and force us to adapt. If we do not step out of our comfort zone, we deny ourselves the opportunity for forward movement. Progress in the rare disease space can mean something as small as improving a process, to something life-changing, such as the development of a clinical trial.

Yet, here we are. We made it. In 2019 the Legacy of Angels Foundation hosted the Krabbe Translational Research Network (KTRN) meeting for the first time. Although the change was a challenge, we do not grow by keeping things “safe”. Growth comes from meeting the challenge and looking at it from a fresh perspective, along with the advancement of technology and research. Similarly, there has been a forward movement with newborn screening (NBS). When our Foundation started in 2008, ONE state tested for Krabbe disease in the first few days of life. With the advancement of NBS technology, The Legacy of Angels Foundation and many NBS experts believe Krabbe disease is ready to be added to ALL newborn screening state panels today.

In 2019 our foundation funded over \$1.4 million in research by adopting sound financial management policies and creating better investment outcomes to ensure our 501(C)(3) has adequate resources to advance our mission in newborn screening, Krabbe disease, and Cystic Fibrosis. The board of directors has shown their commitment, year after year, by steering the organization towards a sustainable future, so that we can bring effective treatments or cures to the bedside of each patient. The board could not do so without their reliance on the Scientific Advisory Board (SAB), who generously donates their time to help TLOAF’s mission.

As you move through this year’s annual report, The Legacy of Angels Foundation will continue “Funding Research with a Purpose” and propel progress towards effective treatments or cures. What is our motivation? Families like the Kirbo’s and Haberman’s, whose lives have been forever changed by Cystic Fibrosis and Krabbe disease. As you read their stories on pages 8 and 10, you will see why the Foundation continues to be committed to our mission. As we look forward to 2020, we look to continue our commitment. We can do better, and we will, with the help of our rare disease innovators.

Warm regards,  
Paul G Rosenau  
*Co-Founder and Chief Operating Officer  
The Legacy of Angels Foundation*



# ABOUT TLOAF

The Legacy of Angels Foundation is a private grant-making organization with a preference for leveraged, strategic funding. Letters of Inquiry are accepted year-round; full grant applications are by invitation only.

## BOARD OF DIRECTORS



**PAUL ROSENAU**  
*Co-Founder /  
President*



**HEATHER TECHMEIER**  
*Board Treasurer*



**STACY PIKE-  
LANGENFELD**  
*Board Secretary*



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*Director*



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## STAFF

### STACY PIKE-LANGENFELD

*Director of Programs and Administration*

### HEATHER TECHMEIER

*Director of Finance*

## CONSULTANTS

### JARED DUFALT

*Tax Accountant*

## OUR MISSION

The Legacy of Angels Foundation, a 501(c)(3) private giving family foundation established in 2008, to improve the lives of children by working to promote the expansion of newborn screening, and to further education, awareness and research of Krabbe disease and Cystic Fibrosis to provide better treatment and a cure.

## OUR VISION

To direct, fund and promote research that develop and enhance treatments and cures for Krabbe disease and Cystic Fibrosis.

TLOAF will promote through education and awareness, the expansion of newborn screening for Krabbe disease and Cystic Fibrosis; benefiting children with the increased probability of early identification and effective access to treatment.

## OUR GUIDING PHILOSOPHY

To invest in research, programs, and initiatives that further the mission and goals of The Legacy of Angels Foundation. Our Board of Director's believe in collaborative efforts to quickly advance TLOAF's mission, leveraged funding to ensure TLOAF's sustainability, and commitment to advancing research through TLOAF's grant program. With these attributes, we can collectively change the outcome for those impacted by Cystic Fibrosis and Krabbe disease.

# 2019 GRANT RECIPIENTS

**Our grant program has grown exponentially** since 2008. The Legacy of Foundation supported just two grants in 2009; one in Krabbe disease with Dr. Joanne Kurtzberg and one in Cystic Fibrosis with the Cystic Fibrosis Foundation in Bethesda, Maryland. At this time, our foundation funds, on average, seven grant projects per year, with 2014 being an exceptional year at a whopping 15.

As we reviewed our portfolio of grant projects funded, we are proud of the accomplishments achieved in Krabbe

disease and Cystic Fibrosis over the past decade. Many of our funded grant recipients have spent their life's career advancing science in newborn screening, Krabbe disease, or Cystic Fibrosis. Being a researcher is not an easy gig. Researchers are often required to find their own funding for their lab, equipment, and the salaries for themselves and others. Thus, we say "bravo to you," for the work each of you are doing to enhance the quality of life for those impacted by Krabbe disease and Cystic Fibrosis.



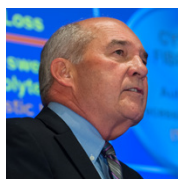
**Studies of GALC Correction Stability after AAV Gene Therapy for Krabbe Disease**

Ernesto Bongarzone, Ph.D.— University of Illinois



**Development of High Throughput Screening Assay for Acid Ceramidase and UGT8 Inhibitors**

Michael Gelb, Ph.D.— University of Washington



**Assessing the Added Value of Whole Genome Sequencing in Cystic Fibrosis Newborn Screening**

Philip Farrell, M.D., Ph.D.— University of Wisconsin, Madison



**Development of Pharmacological Chaperone Therapy for Krabbe Disease**

Chris Lee, Ph.D.— Biomedical Research Institute of New Jersey



**Optimizing the Treatment of the Mouse Model of Krabbe Disease for Translation into Human Trial**

David Wenger, Ph.D.— Thomas Jefferson



**The Paul M. Fernhoff Memorial Lecture Series**

Dawn Laney, MS, CGC— Emory University



**Developing a Target Assay for Substrate Reduction Agents for Krabbe Disease**

Gustavo Maegawa, M.D., Ph.D.— University of Florida

**In 2019,**  
the Foundation  
awarded \$753,579.00  
towards new grant  
projects and another  
\$735,702.94 towards existing grant  
projects. Check out [tloaf.org](http://tloaf.org) for  
more information on our grant program.  
Including previously funded grants since the  
inception of our organization.

**To date,**  
The legacy of angels  
foundation has funded  
more than 80 projects.

# OUR FOCUS AREAS

## NEWBORN SCREENING

Newborn Screening is a simple test to identify babies who may have serious medical conditions. Most babies should get their first newborn screen done before going home from the hospital or birth center, ideally between 24 and 48 hours of birth. Currently, the following states actively screen for Krabbe disease: Illinois, Indiana, Kentucky, Missouri, New York, Ohio, Tennessee, New Jersey, and Pennsylvania. All 50 states perform newborn screening for Cystic Fibrosis. The Legacy of Angels Foundation supports education and research in newborn screening for Krabbe disease and Cystic Fibrosis.

## KRABBE DISEASE

Pronounced krab A-is a genetic neurological condition caused by a mutation/ error on chromosome 14. This error causes the myelin sheath surrounding the nerve cell to deteriorate due to low levels of GALC enzyme. The myelin sheath is crucial for proper transmission of nerve signals throughout the body. A human body can't survive without it. The human body works by sending signals from the central and peripheral nervous systems to other areas of the body for proper function. In layman's terms, your nervous system is that of a circuit board working to send accurate information (signals) to do what it's intended to do: walk, talk, swallow, jump, smile, etc. The body can't function or perform without disabilities, if the signals (information) being transmitted are frayed or not fully intact. The Legacy of Angel's Foundation supports education and scientific research in Krabbe disease.

## CYSTIC FIBROSIS

Cystic Fibrosis is a life-threatening genetic disorder that causes the accumulation of thick sticky mucus and secretions generating issues for the lungs, pancreas, and digestive system. This disorder is caused by a mutation of the Cystic Fibrosis Transmembrane Conductance Regulator Gene (CFTR) and is considered rare, despite affecting nearly 30,000 people in the U.S. The Legacy of Angel's Foundation supports education and scientific research in Cystic Fibrosis.



# OUR NATION'S GREATEST HEALTHCARE PROGRAM-NEWBORN SCREENING

**Newborn screening, many of you have heard of it**, but do you know exactly what this U.S. mandated public health program is? It's a simple three-part test that screens your child for life-threatening conditions, and/or diseases, within the first few days of life. The three-part test includes a blood test, a hearing screen, and a heart screen. Amy Gaviglio from the Center for Disease Control and Prevention states, "since the early 1960s, the newborn screening (NBS) test saves the lives of approximately 13,000 babies each year."

Today, there's currently 61 conditions on the Recommended Uniform Screening Panel, also known as the RUSP. Cystic Fibrosis was added to the RUSP in 2005, but it wasn't until the end of 2010 that all 50 states adopted legislation. Legislative efforts at the state level are independent of the RUSP, as the panel is merely a guide put together by the U.S. Department of Health and Human Services. Therefore, the RUSP is not a government issued directive or law, but a recommendation that states can choose to adopt.

Krabbe disease on the other hand is not on the RUSP. An attempt was organized by the Hunter's Hope Foundation in 2010, but was denied by the RUSP Advisory Committee known as the Heritable Disorders in Newborns and Children. Since 2010, The Legacy of Angels Foundation has worked closely with key opinion leaders, Dr. Michael Gelb (WA), Dr. Joseph Orsini (NY), and Dr. Dietrich Matern (MN) to advance the NBS technology for Krabbe disease.



Newborn screening for Krabbe disease now utilizes second tier testing technology. This equates to a two-step process. In step one, NBS labs measure the activity of galactosylceramidase (GALC) from the newborn screening blood spot. If the GALC activity is low, the blood spot progresses to step two for targeted genetic sequencing and psychosine analysis.

Currently, nine states test for Krabbe disease in the first few days of life. It is our hope, that soon, Krabbe disease will be a part of RUSP, guiding all 50 states to add this fatal disease to their NBS panel. With the addition of advanced newborn screening technology and a 20-plus-year track record utilizing bone marrow transplantation to stabilize the disease, The Legacy of Angels Foundation along with many NBS experts, believe Krabbe disease is ready to be added to all newborn screening state panels today.

**“ Since the early 1960s, the newborn screening (NBS) test has saved the lives of approximately 13,000 babies each year. ”**

## Newborn Screening

### OVERVIEW OF THE BLOOD SPOT TEST

- 1.) HEEL PRICK**  
A newborn baby's heel is pricked to collect 4-6 blood spots onto a special piece of filter paper (NBS card).
- 2.) NBS CARD SENT FOR ANALYSIS**  
All newborn screening blood spots are sent to your state-specific laboratory.
- 3.) RESULTS**  
Results from the test are made available to your baby's doctor within 5-7 days of birth. Note: Be sure to request a copy of your child's NBS test so you and your baby's doctor can be certain he/she is healthy.
- 4.) CONDITIONS BY STATE**  
The list of conditions a baby is tested for depends on the state. Each state's legislature is responsible for their own health and human services program. You can learn what your state offers for NBS by visiting [babysfirsttest.org](http://babysfirsttest.org).
- 5.) CONDITIONS ON THE RUSP**  
RUSP stands for Recommended Uniform Screening Panel and is a guide for states to utilize. Currently, 61 conditions are recommended by the Advisory Committee on Heritable Disorders in Newborns and Children (ACHDNC).
- 6.) CYSTIC FIBROSIS AND KRABBE DISEASE**  
The Legacy of Angels Foundation supports advancements in NBS for Cystic Fibrosis (CF) and Krabbe disease (KD). All 50 states test for CF but only 9 states currently test for KD: IL, KY, IN, MO, NJ, OH, PA, TN, NY.

# KRABBE DISEASE: THE KIRBO FAMILY STORY

**Bringing a new life into this world is truly an extraordinary event.** This was the feeling Carlyle and Sloane Kirbo felt as they held their only child for the first time on July 3rd, 2016. An absolutely healthy and perfect little boy, with big brown eyes, named Cloud. Cloud prospered and grew, meeting every milestone on time, until June of 2019. At this time, the Kirbo family witnessed some changes, mostly with his gait, that would leave them searching for answers for approximately two months.

Initially, Cloud was diagnosed with Guillain Barre Syndrome (GBS), a rare disorder causing the body's immune system to attack one's nerves. Yet, after two weeks of therapy to treat Cloud's GBS diagnosis, his symptoms only worsened. The Kirbo family returned to their neurologist for more answers. A nerve conduction study was ordered for Cloud. The results of this study were concerning, requiring Cloud to be admitted to Children's Hospital of Atlanta (CHOA) on July 25th, 2019.

Cloud was hospitalized at CHOA for a grueling two-weeks. Carlyle and Sloane view the hospital stay as a heartbreaking series of tests to uncover the correct diagnosis for Cloud. Yet, that didn't appear to be the worst of it. Carlyle and Sloane recount the words spoken to them during a hospital care team meeting. "Cloud has Krabbe disease, a severe neurological disease that inhibits the production of myelin. He will start to lose all of his abilities such as walking, standing, and even breathing on his own. He will progressively get worse and eventually pass away. You have approximately two-to-seven years with your son. I am sorry." This was definitely the worst part. We were stunned and scared for our beautiful son," noted Carlyle and Sloane.

CHOA discharged Cloud and sent him home for comfort, care and cuddles. A few days later, the Kirbos received a call from Dr. Maria Escolar, a tenured Professor of Pediatrics and Neurodevelopmental Disability at the University of Pittsburgh Medical Center (UPMC) informing Cloud's parents that their son might be a candidate for a bone marrow transplantation. Dr. Escolar encouraged the Kirbo family to review her program, as well as Dr. Joanne Kurtzberg's program at Duke University Medical Center. Both medical doctors have vast knowledge and expertise in the treatment and care of Krabbe disease. The Kirbo family spent time evaluating both facilities and made a family decision to have their only son undergo a bone marrow transplantation (BMT) at UPMC following an in-depth clinical evaluation by Dr. Maria Escolar.



*(L-R): A picture of Cloud and Carlyle taken the day he was admitted to the hospital (pre-transplant).*

**“ We plan to give him the quality of life he deserves because his laugh and smile are priceless to us. ”**



*Picture taken prior to Cloud's Krabbe disease diagnosis. (L-R) Sloane, Cloud, and Caryle*



*Picture taken at UPMC Ronald McDonald House. Cloud spent his third Christmas more than 600 miles away from home.*

On September 20th, 2019, Cloud received his donor cells via a BMT. It was the first day the Kirbo family felt a sense of hope for their son. Although they experienced many ups and downs throughout the BMT process, they are thankful their 152-day hiatus from their Brainbridge, Georgia home, brought back Cloud's infectious smile. As Caryle and Sloane recount, "Although Cloud has lost so much over the last year, including the ability to walk, pick up objects and his vision, he continues to keep a smile on his face. He loves to joke and make others laugh, but the best part of it all, Cloud is blissfully unaware of how much this terrible disease has changed his life."

While the Kirbo family continues to work diligently to strengthen Cloud's overall health through a variety of therapies, they have become informed about the importance of newborn screening for Krabbe disease. Currently, the Kirbo family is working with the Georgia Department of Health and their newborn screening committee to have Krabbe disease added to the NBS panel. If Cloud had the opportunity to receive the BMT prior to becoming symptomatic, his list of disabilities would be minor compared to those he endures today. Yet, the Kirbo family remains optimistic and hopeful. As Caryle and Sloane state, "even though a cure may not be attainable for my son, we plan to give him the quality of life he deserves. His laugh and smile are priceless to us. Our ultimate goal for Cloud's life is to make sure he's happy and enjoys life to the fullest."

#### **SUPPORT THE KIRBO FAMILY**

- Follow and send words of encouragement to them on Facebook @cloudskrabbejourney
- Donate to their GoFundMe page to help offset ongoing medical bills at <https://www.gofundme.com/f/caring-for-cloud-kirbo>

# CYSTIC FIBROSIS-ONE MOTHER'S STORY

**Angela Haberman, an expectant mother from a rural area in Minnesota** gave birth to her second child in March of 2002. A beautiful baby boy named Casey. Joy and immense love filled Angela's heart when she held her son for the first time. The pregnancy and birth were all relatively normal. She had no immediate concerns about the future health of her son, Casey.

Yet, with each passing week, Angela grew worrisome about her newborn boy. Casey struggled to maintain his birth weight, he cried a lot, he had bouts of projectile vomiting and long periods where he would cry and/or be unsettled. These alarming symptoms prompted several visits to the local ER, yet nothing overly concerning was discovered during those visits.

However, when Casey approached five months of age, he grew dangerously ill. Angela recalls very vividly the next series of events. She states, "We arrived at St. Mary's Hospital in Rochester, MN the night of August 8th, 2002. By the following morning, my five-month-old son was on a respirator fighting for his life. It was an absolute nightmare. I was so scared. The doctors informed me that Casey had pneumonia and his right lung had collapsed." The medical team was forced to place Casey in a medically induced coma to try and save his life. A traumatic series of events compounded by news that Casey has Cystic Fibrosis, a rare disease causing the build-up of thick mucus in the lungs, making it difficult to breathe.

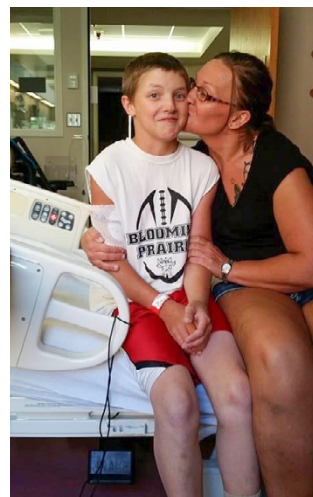
Thankfully, after three weeks on a respirator at St. Mary's hospital, Casey recovered and was discharged on September 18th, 2002. Today, Casey is 18; a happy, healthy young man. Every night Casey receives approximately nine hours of supplemental nutrition from his feeding tube. Angela states, "Casey needs to utilize his feeding pump until his body is done growing and/or until he's able to maintain a healthy weight." In addition to his supplemental nutrition therapy, Casey spends 30 minutes in the morning and evening doing chest therapy, swallows six pills three times a day with a full meal and, another four pills with a snack.

Many advances have occurred in the Cystic Fibrosis space with the addition of new, more effective medications to keep patients healthy and out of the hospital. Yet, the new therapies are not approved for all CF patients and Casey is one of those individuals. However, Angela remains thankful and hopeful. She states, "I am happy to see CF as part of newborn screening. The information we are armed with today aids my nieces, nephews, and other family members with pertinent information in family planning. My son is a true joy and miracle; I am so thankful there's treatment for CF. Just like any parent, I will look forward to the day a cure is available for this disease."

**“ My son is a true joy and miracle and I am so thankful there's treatment for CF. ”**



**Casey today, always wearing a pair of cowboy boots and a hat.**



**Mom, Angela, giving Casey some affection during one of their many hospital stays.**



**Casey receiving a nebulizer treatment during a hospital stay. Casey is hospitalized 1-2 times/year due to CF complications.**

# RECIPIENT OF THE INAUGURAL SUE ROSENAU LEGACY AWARD



*(L-R) Late-Co-founder, Sue Rosenau and Dr. David Wenger*



*Dr. David Wenger sporting a t-shirt with one of his favorite responses to questions.*

The Legacy of Angels Foundation Board of Directors thought long and hard on how to continue the momentum that our Chief Operating Officer, Sue Rosenau, instilled prior to her passing. Sue, the inspirational leader, and driving force behind establishing our 501(c)(3) organization, lost her three-year battle with cancer in July of 2018. We believed honoring our beloved co-founder with a yearly accolade, named the Sue Rosenau Legacy Award, would keep her kindred spirit and memory alive in the Cystic Fibrosis and Krabbe disease community. Two rare diseases affecting her family's genetics.

The recipient, a name the Krabbe disease (KD) community equates to that of a Hollywood star, is the legendary Dr. David Wenger. It's believed this man truly will not rest, won't have the last word, or stop saying, "I've already tried that," until patients diagnosed with Krabbe disease have a cure. The work and commitment of Dr. David Wenger is a testament to his fondness for the KD community and the patients affected by this devastating neurological disease.

David's knowledge and grit are connected to many significant advancements in Krabbe disease. He's known for being the first to purify the missing enzyme, GALC, and the first to clone the GALC cDNA gene. He's also identified over 100 mutations causing KD in the human patient, successfully placed human and mouse cDNA's into several viral vectors including retroviral, adeno-associated viruses, lentivirus and SV40. Dr. Wenger has transduced oligodendrocytes from the twitcher mouse with viral vectors containing human GALC cDNA and corrected them to a normal phenotype. Additionally he has written many peer-reviewed journal articles and was a featured presenter at several elite conferences around the world.

Congratulations Dr. David Wenger! Thank you for caring about a disease that affects approximately 40 patients per year worldwide.

**Take a moment** to watch the three-minute video, "Dr. David Wenger-A Pioneer in Krabbe disease," to learn more about this brilliant and witty, biochemical and molecular genetics guru @thelegacyofangelsfoundation Facebook page.

# HIGHLIGHTING ONE OF OUR BOARD MEMBERS

**Brett Rosenau**, son of Co-founders Paul and the late-Sue Rosenau, joined The Legacy of Angels Foundation Board of Directors in 2009. Brett has spent the past 15 years advocating for two rare diseases that resonate with his family genetics: Cystic Fibrosis and Krabbe disease. His passion for The Legacy of Angels Foundation is personal. Brett is the uncle to Makayla Pike, who left this earth much too soon as a result of her fatal Krabbe disease diagnosis.

Brett, a father himself, believes TLOAF works diligently to fund projects with the biggest impact in an effort to help therapeutic advances reach the bedside of patients. He thrives on helping the organization remain committed to its mission. As Brett states, “being a board member is rewarding. I feel connected to the progress and change occurring in both diseases as a result of our board working in tandem with some of the best key opinion leaders in the rare disease space.”

On the personal side, Brett currently resides in New Glarus, Wisconsin with his wife Tynisa, and his daughter Lauren (7). Brett has spent many years as a mechanic in the private sector and with the Fleet division. He is currently the Fleet Maintenance Program Administrator for the city of Madison. In his current role, Brett loads technical data and preventative maintenance schedules into the fleet management report system, aids in developing vehicle service reports, and participates in other various operation efficiency analytics. In his free time, Brett enjoys boating, snowmobiling, gardening, biking, and spending time with his family.



**“ I feel connected to the progress and change occurring in both diseases. ”**

# OTHER 2019 PROGRAMS SUPPORTED BY TLOAF



*Stacy Pike-Langefeld of TLOAF attending the Rare Disease Clinical Research Network meeting in Maryland. Others pictured (L-R) Tina Urv from NIH, Cara O’Neil from the Cure Sanfilipo Foundation, Terri Klein from the MPS Society, Rogerwene Gifford from Cincinnati Children’s Hospital, and Erica Barnes from Chloe’s Rare Fight Foundation.*



*Paul M. Fernhoff Lecture Series in Atlanta, Dr. Rodney Howell receives the Paul M. Fernhoff Award. Pictured with Dr. Howell is (L-R) Dawn Laney from Emory University, Robert Vogt from the CDC, and Heather Techmeier from TLOAF.*



*(L-R) Tammy Hontz, TLOAF Co-founder, Paul Rosenau and Laura Cross at the inaugural KrabbeConnect Gala in Minneapolis.*



*Cystic Fibrosis Breath of Life Gala in Minneapolis. Co-founder, Paul Rosenau and board members Julie McCarrier and Stacy Pike-Langefeld were in attendance with other friends of the foundation as follows: (L-R) Jason and Heidi Squire, Josh Langenfeld, Jared and Stacy Dufault, Tammy Hontz, and Lancy Keely.*

# A YEAR OF MANY FIRST'S FOR THE 2019 KRABBE TRANSLATIONAL RESEARCH NETWORK MEETING



**The Legacy of Angels Foundation hosted** the 2019 Krabbe Translational Research Network (KTRN) meeting May 29th-31st in Minneapolis, MN. This is the **first** time, since inception, the foundation has held the KTRN close to home. The meeting took place at the beautiful McNamara Alumni Center, located on the University of Minnesota campus.

Another new **first** for TLOAF revolved around the foundation fully facilitating the meeting and agenda in conjunction with a committee of leukodystrophy experts. This was instituted by the TLOAF Board of Directors. Ensuring the leaders in the clinical and research space of Krabbe disease remain collaborative, share information and resources as well as, engage in formal and informal networking. The meeting utilized aspects of the Gordon Research Conference (GRC) model and selected individuals with cutting edge research in the biological, chemical, and physical sciences, including related technologies for podium presentations.

Over the two-and-a-half day gathering, 18 presentations guided participants through the history of Krabbe disease, the usefulness of psychosine to predict disease, post-mortem insights on the effects of Krabbe disease to the human brain, conditions for bone marrow transplantation and gene therapy, state-to-state implementation of Krabbe disease newborn screening, and clinical trial readiness. It was a comprehensive schedule of insightful presentations, group discussions, mapping of new projects, and networking. As Dr. Ernesto Bongarzone, a tenured professor of Neuroscience at the College of Medicine at the University of Illinois, Chicago states, “the KTRN meeting is a well-organized effort working cohesively with key opinion leaders to change the trajectory of Krabbe disease.”



From the patient's perspective one element integral to this meeting was providing meaning and purpose to those directly advancing therapies for Krabbe disease. As Stacy Pike-Langefeld, Director of Programs and Administration states, “we need to ensure that the future of these innovative therapies are purposeful to those directly impacted by the disease: the patients and caregivers”. This year, the parent panel focused on two different family perspectives: (1) Newborn Screening and (2) Transplantation. Take a moment to read the information box as we recount a few of the questions and answers from our participants.

As we closed out another KTRN meeting, we recognized the **first** individual for the inaugural Sue Rosenau Legacy Award. This legacy award recognizes an inspirational leader who collectively creates lasting change and measurable differences in one or more areas of our mission. The individual honored has delivered extraordinary contributions, worked to propel progress in an effort to develop better treatment options, and has continuously given altruistic support to the patient community; a replica of the late-co-founder, Sue Rosenau. To learn who received this premier award, please visit the article, “Recipient of the Inaugural Sue Rosenau Legacy Award,” on page 11.

**Parent Panel 1:** Patient identified with late-onset Krabbe disease via NBS

**Moderator:** Stacy Pike-Langefeld

Question	Answer
Upon receiving the information about your child “possibly” having Krabbe disease, were you connect with a genetic counselor quickly? Was the genetic counselor helpful in answering some of your initial questions?	<i>The genetic counselor was great and empathetic, but we did a lot of “Googling” to ensure we had all pertinent information to make the best decision for us. We were not provided a list of disease experts in Krabbe disease.</i>
How can the newborn screening process be improved when a child is identified as having Krabbe disease?	<i>Looking back, it would be helpful if families were provided a list of disease experts and support groups upon diagnosis.</i>
Are you thankful for Krabbe disease NBS in your state or has your child’s diagnosis affected your ability to enjoy his growth and development?	<i>Yes, for us, we are thankful for NBS. However, I can understand why others feel differently. We do watch him closely, ensuring his developing is on track.</i>

**Parent Panel 2:** Patient transplanted within the first month of life due to prior family history

**Moderator:** Stacy Pike-Langefeld

Question	Answer
How does the first 10 years post-BMT compare to the last few years?	<i>The first 10 years she did well. Struggled with gross motor skills but in the last several years, fine motor skills are quite troublesome. Up until the age of 4 she could walk with assistance. At 6 she required a hand powered wheelchair. At 12 she required a spinal fusion for scoliosis.</i>
What would excite you about a new therapy for patients with disease progression after a BMT?	<i>Improved quality of life. Our child is loved by many and brings joy to our life. We just need a therapy to remyelinate the peripheral nervous system.</i>
What do you want researchers to know about transplant and would you transplant again if you had to do it all over?	<i>We know transplant is not a cure, but it provided our child with a quality of life that’s remarkably better than untreated patients. If I had to do it over, I would absolutely transplant again.</i>

# 15TH ANNUAL WORLDSymposium™

February 4-8, 2019

*We're Organizing Research on Lysosomal Diseases*

**Since inception,** The Legacy of Angels Foundation has become accustomed to prioritizing conferences relevant to our mission. Among the top conference related to TLOAF's mission is the *WORLDSymposium*, which occurred February 4th-8th in Orlando, Florida. This conference, now in its 15th year, works to highlight basic research, translational studies, and the clinical application of lysosomal storage diseases. A lysosomal storage disease is classified by a genetic deficiency in an enzyme located in the sac of a lysosome. According to the National Organization on Rare Disorders (NORD), nearly 50 different kinds of lysosomal storage disorders (LSDs) have been identified. Krabbe disease is classified as a LSD which is one of our foundations focus areas.

In Krabbe disease, patients develop a genetic error on chromosome 14 causing a deficiency in galactosylceramidase (GALC) enzyme. This enzyme is responsible for forming an adequate myelin sheath. Researchers from all over the country attend the *WORLDSymposium* to obtain updates, discuss projects, and network, in hopes of developing a new therapy for Krabbe disease and other LSDs. The four-day conference, although long and scientifically cumbersome, provided some exciting developments in Krabbe disease:

- 1** Beta-cyclodextrine, a binding agent, was looked at by Dr. Gustavo Maegawa at the University of Florida, in a murine model of Krabbe disease. This binding agent is used as an absorption enhancer across many structures. Dr. Maegawa and his team discovered beta-cyclodextrine helped preserve myelinated axons. However, it was not effective in the central nervous system (CNS), due to its inability to cross the blood-brain barrier.
- 2** Psychosine is a valuable biomarker for Krabbe disease. Adam Guenzel from the Mayo Clinic, Rochester, noted, in his podium presentation, that psychosine is a powerful mechanism to discern between early-onset (infantile) Krabbe disease and late-onset Krabbe disease. Routine psychosine testing can be an effective way to monitor the stages of Krabbe disease for treated and untreated patients.



*(L-R) Paul Rosenau, Heather Techmeier, and Michael Gelb*



*(L-R) Paul Rosenau, Stacy Pike-Langenfeld, Heather Techmeier, and Julie McCarrier*

- 3** Dr. Paul Orchard, Medical Director of the Inherited Metabolic and Storage Disease Program at the University of MN provided some preliminary results on MGTA-456, a clinical trial sponsored by Magenta Therapeutics for patients diagnosed with Krabbe disease, Hurler Syndrome, Metachromatic Leukodystrophy (MLD), and Cerebral Adrenoleukodystrophy (ALD). Initial data shows that the high stem cell dose of MGTA-456 appears to accelerate and improve engraftment. Only three patients were enrolled at the time of this report.
- 4** Dr. Maria Escolar, a tenured Professor of Pediatrics and Neurodevelopmental Disabilities at the University of Pittsburgh, presented on the long-term neurodevelopmental outcomes of hematopoietic stem cell transplantation for late-infantile Krabbe disease (LIKD). This project was funded, in part, by TLOAF. Dr. Escolar showcased some of her natural history information, proving that LIKD have a much higher quality of life than non-transplanted LIKD patients. Many of the patients did well through transplant, had little to no complications. They are able to communicate effectively, express emotion, and are cognitively age appropriate.
- 5** Tandem mass spectrometry is a diagnostic tool utilized to diagnose many lysosomal diseases. Dr. Michael Gelb, from the University of Washington, charismatically discussed the quantification procedure of his 11-plex LSD enzyme assay using LC-MS/MS. The typical run-time to complete the assay analysis is approximately two minutes, offering a systematic solution to newborn screening labs for several lysosomal diseases, including Krabbe.
- 6** Chris Lee presented a poster on, “Pharmacological Chaperone Therapeutics for Krabbe disease.” This work, funded by TLOAF, is a three-year grant to utilizing -lobeline (LB) to correct the GALC missense mutations responsible for protein misfolding. Initial results suggest that PC agents, like LB, could be valuable in helping correct the function of GALC.
- 7** Julia Kofler, Assistant Professor of Pathology at the University of Pittsburgh, presented a poster on, “Clinical and Neuropathologic Findings in Two Long-Term Survivors of Krabbe disease with and without Umbilical Cord Blood Transplant (UCBT).” The pathology results of two patients who lost their life to Krabbe disease, one treated with UCBT and the other patient untreated, proved that UMBT does provide positive results. Much of the central nervous system (CNS) of the UCBT patient showed stable myelination, whereas the untreated patient’s CNS had severe deterioration of the myelin sheath and/or white matter of the brain. Yet, the pathology results also indicated inadequate myelination of the peripheral nervous system (PNS) in the UCBT patient. Additional studies are underway to further understand the PNS and the role of UCBT.

# 2019 APHL NEWBORN SCREENING AND GENETIC TESTING SYMPOSIUM

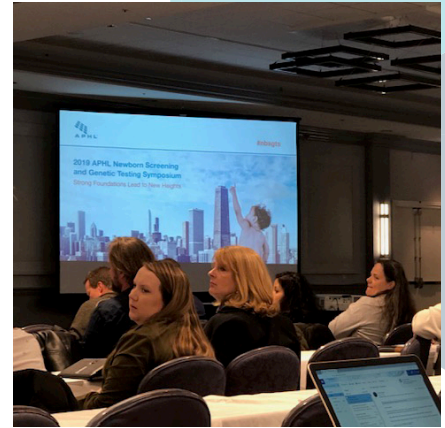
The Association of Public Health Laboratories Newborn Screening (NBS) and Genetic Testing Symposium is a favorite of attendees Stacy Pike-Langenfeld and Heather Techmeier of The Legacy of Angels Foundation. This year, the APHL conference took place April 7th-9th in the windy city of Chicago, IL. This conference is organized to collectively present up-to-date information on new screening methods, to share best practices in newborn screening laboratories across the country, and to showcase new conditions that show promise in being added to the Recommended Uniform Screening Panel (RUSP).

A statement that resonated strongly with each passing day was, “newborn screening is more than a test, it’s a system,” spoken by Joanne Barkus of the Minnesota Department of Health. Adding a new disease and/or condition to a states NBS panel takes time to organize resources, train staff, and build protocols between many entities. It’s quite remarkable the efforts our country has put forth towards testing babies. Nearly 126 million babies born outside of the United States do not have access to this public health program.

“ **Newborn screening is more than a test, it’s a system.** ”

Some of the more interesting discussions that occurred during select presentations revolved around cost, timely and accurate data exchange, and the need for adequate disease-specific information for families upon diagnosis. According to Nisha Quasba of APHL, a state’s newborn screening fees range from \$0-162.98. Why is there a range in the fees nationwide? The costs can differ from state-to-state due to the following, the number of disorders on each states NBS panel differ from state-to-state, varying state protocols (i.e. one screen versus two screens), fluctuating annual birth rates, and due to the type of laboratory (state, regional, or commercial) contracted to perform the screening analysis.

Before TLOAF attendees packed up their bags and returned home, they spent some time meeting with Michael Gelb, Ph.D., from the University of Washington, and Mei Baker, Ph.D., from the University of Madison. Michael is a biochemist working to advance newborn screening efforts in several leukodystrophies, including Krabbe disease. Mei Baker is the co-director of the Newborn Screening Laboratory at the Wisconsin State Lab of Hygiene. For more information on this conference, visit [aphl.org](http://aphl.org).



(L-R) Heather Techmeier, Mei Baker, and Stacy Pike-Langenfeld

# FINANCIAL TRANSITION

Since our inception in 2008, The Legacy of Angels Foundation (TLOAF) has built a proven track record of providing grants for researchers in newborn screening and the rare disease space. It has been quite an achievement, that while granting over \$17 million, we have continued to grow our portfolio from \$26.4 million to over \$34 million in assets as of December 31, 2019. The makeup of the foundation's investment structure is different than it has been in the past, which comes with both advantages and disadvantages. The benefit is that it will be easier to track our financial performance. However, this comes with some emotional challenges due to the size of the foundation.

TLOAF is committed to long-term and effective investment management strategies. Our goal within

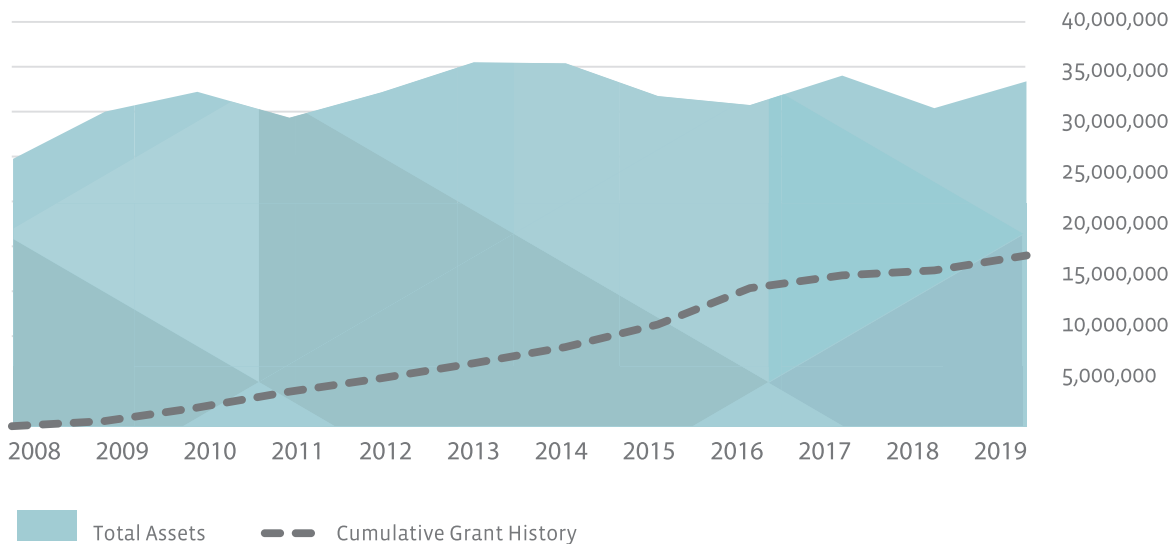
our portfolio is to create better investment outcomes by aligning our portfolio with our purpose, embracing uncertainty, harnessing markets, avoiding predictable disappointments, and advancing with science. The goal outside our portfolio is to continue to look for partnership opportunities with others to maximize our funding support. We also rely on our growing Scientific Advisory Board (SAB) which is composed of rare disease medical experts. These experts generously donate their time to help the mission Paul and Sue created at inception.

***Improving the lives of children by working to promote the expansion of newborn screening, and to further education, awareness and research of Krabbe disease and Cystic Fibrosis to provide better treatment and a cure.***

## THE LEGACY OF ANGELS FOUNDATION BALANCE SHEET

As of December 31, 2019

ASSETS		LIABILITIES AND EQUITY	
Current Assets	\$23,488,086.33	<b>Liabilities</b>	
Other Assets	\$10,593,889.28	Current Liabilities	\$479.80
		<b>Total Liabilities</b>	<b>\$479.80</b>
		<b>Equity</b>	
		Retained Earnings	31,432,597.51
		Net Income	2,648,898.30
		<b>Total Equity</b>	<b>\$34,081,495.81</b>
<b>TOTAL ASSETS</b>	<b>\$34,081,975.61</b>	<b>TOTAL LIABILITIES AND EQUITY</b>	<b>\$34,081,975.61</b>





**THE LEGACY OF ANGELS FOUNDATION**

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**The Legacy of Angels  
FOUNDATION**