

2017-2018 IMPACT REPORT

CONQUERING CHILDHOOD CANCER



Four Diamonds child Devin

WE ARE FTK®

(For The Kids™)



The Four Diamonds mission is to conquer childhood cancer by assisting kids and families treated at Penn State Children's Hospital through superior care, comprehensive support and innovative research.



Four Diamonds child Lesenia

IN THE U.S.

more children die from cancer than any other disease.



An estimated

**16,000
CHILDREN**

will be diagnosed with cancer this year, which means two classrooms of kids are diagnosed with cancer every day.



Four Diamonds child Trent

FOUR DIAMONDS IS HOPE



Trent was diagnosed with leukemia when he was just two years old, and his family's lives changed forever.

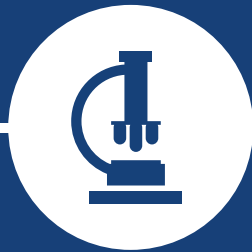
Trent's mom, Rebecca says she and her husband were speechless when their social worker explained that **FOUR DIAMONDS WOULD COVER ALL MEDICAL EXPENSES RELATED TO TRENT'S CANCER CARE NOT COVERED BY INSURANCE.**

“Four Diamonds and Penn State Children’s Hospital are amazing...each child matters, each kid has a name and each kid’s family members matter, too. We are thankful and proud to be part of this big family.”

Rebecca says that friends, family and faith are the core of his strength. Trent loves the story of David and Goliath. He sees himself as David, determined to beat the Goliath in his life - cancer.

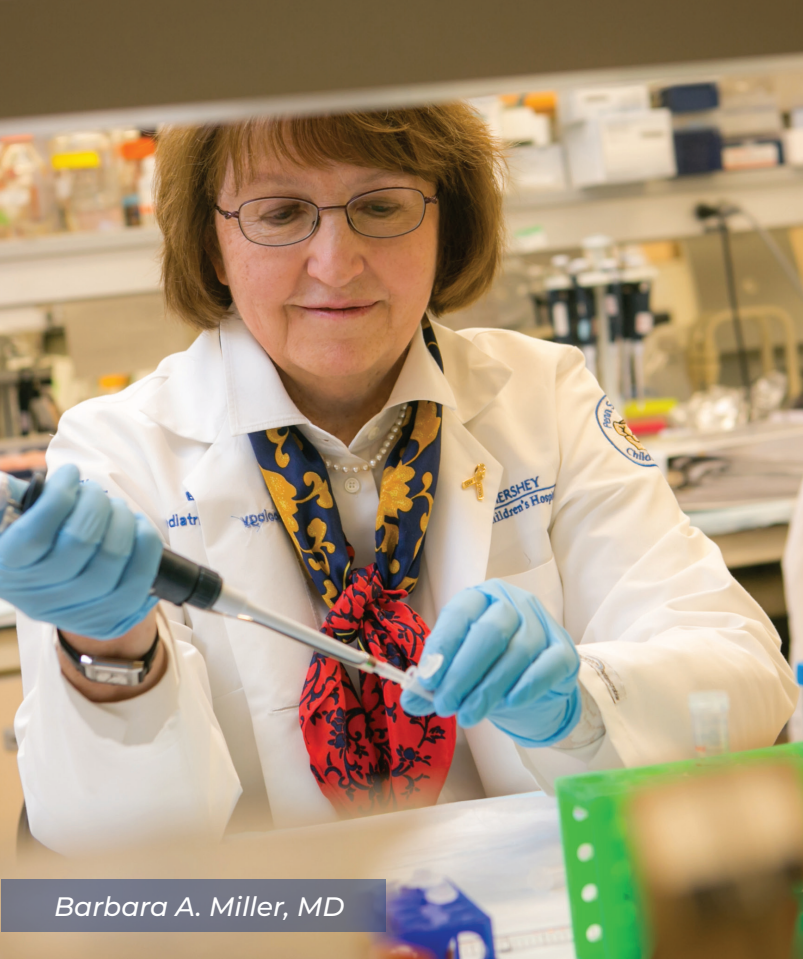
Rebecca shared that Trent gained strength especially through big sister Reese. “During Trent’s treatment he would light up when she came to visit him in the hospital. Child Life also provided tremendous support and strength, and helped both Trent and Reese just be kids.”

LOCAL RESEARCH GLOBAL IMPACT™.

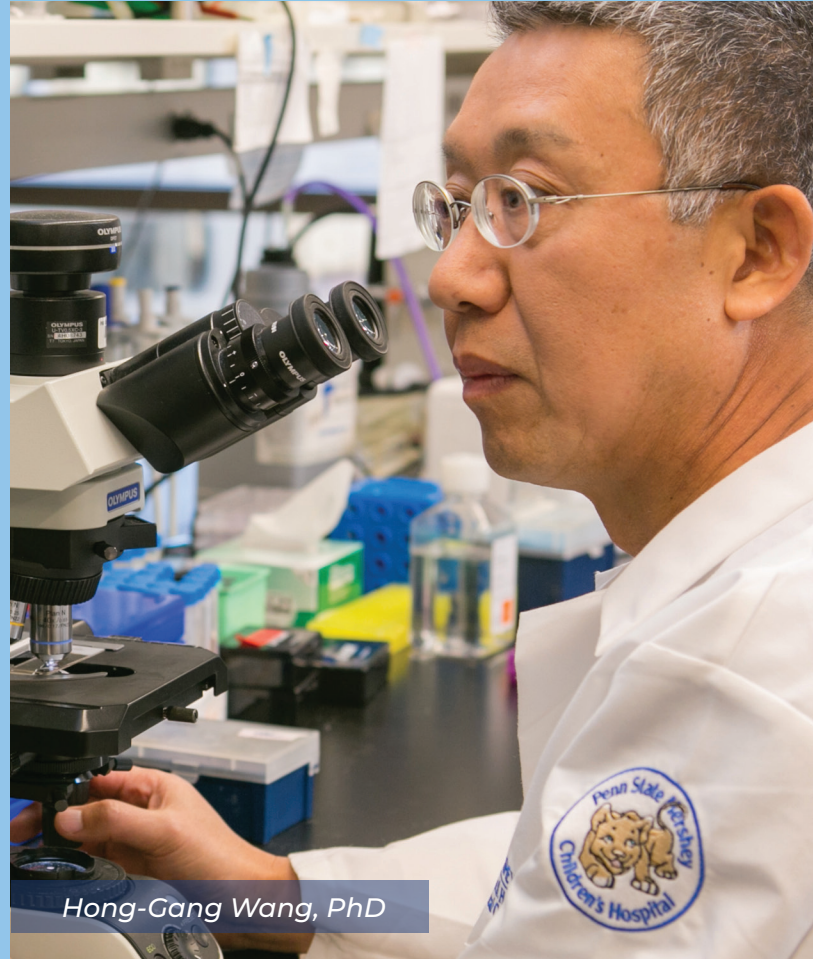


Four Diamonds provides essential funding for some of the nation's most promising laboratory and clinical research programs at Penn State Hershey Medical Center and Penn State College of Medicine, with

**ONE
GOAL:** TO CREATE A FUTURE
FILLED WITH BETTER
TREATMENTS AND CURES



Barbara A. Miller, MD



Hong-Gang Wang, PhD

Four Diamonds researchers find removing a DNA regulator slows leukemia progression and may improve survival.

Scientists in the Four Diamonds epigenetics lab are working to find new targets for potential therapies by studying how an organism changes when genes are turned on or off (called gene expression). They first found that a specific DNA regulator plays an important role in how acute myeloid leukemia (AML) cancer cells develop. They then discovered that if they blocked the same DNA regulator, the leukemia grew slower. By interfering with how the DNA regulator works, our research team may be able to manipulate cells to stop reading genes that promote cancer growth.

2018 | Published in *Blood*

Four Diamonds scientists find a way to inhibit tumor-promoting proteins in brain cancer.

A study by Four Diamonds scientists has laid the groundwork for a new potential therapy for Glioblastoma, the most aggressive brain cancer without effective treatment. The research team found that temporarily increasing the calcium level in a cell can activate enzymes that suppress tumors. These enzymes change and block proteins in the cell that promote tumors. Researchers are now working to suppress the proteins as a new potential therapy.

August 2018 | Published in *Oncogene*

Four Diamonds scientists discover build-up of unsealed cell “trash bags” causes death of leukemia cells.

Autophagosomes are like cellular trash bags that trap and seal off waste for the cell to destroy or recycle. A recent study by Four Diamonds researchers found that when cells can't “take out the trash,” it piles up inside the cell and wreaks havoc. More specifically, when autophagosomes are blocked and can't close off the cell's waste, it leads to cell death. Their work focused on acute myeloid leukemia—the second most common type of leukemia in children—and this discovery could aid in the development of novel and clinically relevant strategies for cancer therapy.

December 2017 | Published in *Cell Death and Differentiation*

Clinical trials offered by Four Diamonds provide hope for children with tumors that are difficult to cure; Four Diamonds is part of the team pursuing FDA approval for new therapy.

Children whose cancer has relapsed or has not responded to standard treatment find hope through clinical trials, which offer new experimental ways to treat cancer. More than a dozen clinical trials to help these children are offered through the Four Diamonds pediatric oncology Experimental Therapeutics Research and Clinical Team (ExTRaCT). The exciting results of one trial was recently published, showing a substantial improvement in overall survival for patients with high-risk neuroblastoma. These patients traveled to Penn State Children's Hospital from across the country to participate in the multicenter trial, which was sponsored by Beat Childhood Cancer. In this trial, after finishing standard treatment patients received a specific medication every day for two years. This medication blocks certain compounds and enzymes that are necessary for this type of cancer to grow. Based on the successful results

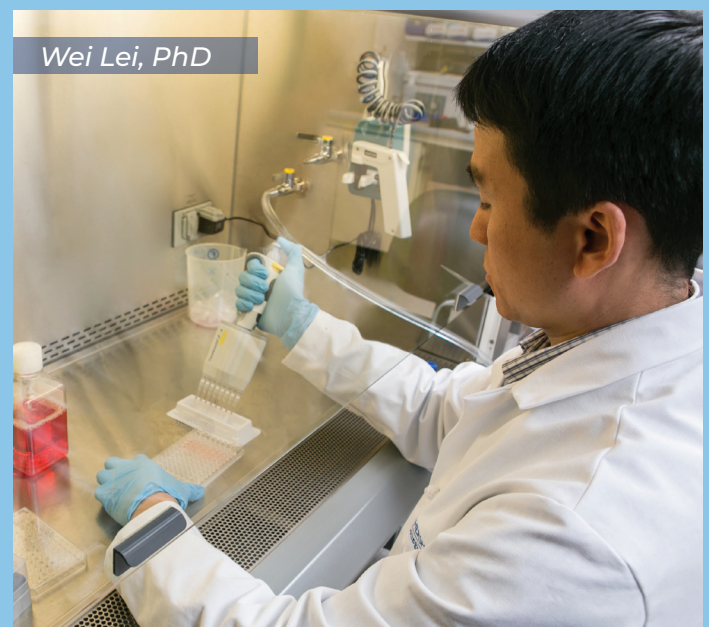
of the trial, the Four Diamonds ExTRaCT team is helping to pursue FDA approval for this new therapy.

September 2018 | Published in *Scientific Reports*

Four Diamonds team identifies new cellular targets to make chemotherapy more effective in leukemia and neuroblastoma.

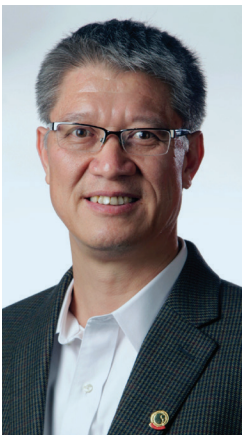
Researchers have uncovered something on the surface of many cancer cells—an ion channel called TRPM2—that helps cancer cells live longer, make energy and avoid damage. The team has identified multiple ways to interfere with this channel, making it harder for cancer cells to survive and making them more sensitive to chemotherapy. The team continues to find new pathways to disrupt and has started searching for drug options to block the cell channels in cancer patients. They have already seen a positive impact on neuroblastoma and leukemia cells in the lab, and they believe that a wide number of other cancer types may benefit from the same approach.

Pending publication | *American Journal of Physiology: Cell Physiology* Additional manuscripts are submitted or in preparation for publication.



Wei Lei, PhD

EXPANDED EPIGENETICS AND GENE REGULATION RESEARCH PROGRAM



Suming Huang, PhD, joined Penn State College of Medicine in March 2018 as director of the Epigenetics and Gene Regulation Research Program. Instead of focusing only on what is written in our DNA, this innovative approach studies the impact of outside influences on how and even whether our genes' DNA is

read. By doing so, Four Diamonds researchers are working to uncover explanations—and possible treatment opportunities—for a wide range of disease processes, including pediatric cancers.

Huang's own research looks at the way genes regulate the creation of new blood cells, and the ways in which that process may veer off course. By learning how this process works, Huang hopes to identify the particular networks and what

exactly goes wrong with them when they cause diseases such as leukemia.

Numerous technology developments from Huang's past work have advanced the field of gene regulation research. He continues to investigate the way the 3-D structure of our DNA impacts the body's activation of cancer-causing genes. His lab also investigates the role of non-coding elements of our genetics in how blood and leukemia cells are made.

In his new role as program director, Huang hopes to expand the breadth of the Epigenetics and Gene Regulation Research Program to enable increased research efforts, recruitment of nationally renowned faculty and a far-reaching impact on childhood diseases. Huang has published more than 60 peer-reviewed research papers and receives funding from numerous grant agencies, including the National Institutes of Health.

**BECAUSE OF
FOUR DIAMONDS,**

Penn State College of Medicine can attract world-class researchers and provide stable funding to support our researchers' work for **BETTER TREATMENTS AND CURES FOR CHILDHOOD CANCER.**

“Every time I look at her I think, ‘I get to keep her.’ Because for awhile I didn’t know if I would get to keep her.”

MARY, FOUR DIAMONDS MOM



Four Diamonds child Theresa, pediatric cancer survivor

OUR RESEARCH SAVES KIDS LIKE THERESA



Theresa is the youngest of 11 children and is a fun-loving, inquisitive and energetic child. In August of 2014, nine-year-old Theresa was diagnosed with Osteosarcoma in her right femur that had spread to her lungs. She had a 30 percent chance of surviving.

During treatment, Theresa's tumors were not responding to standard therapy. Doctors at Penn State Children's Hospital knew they needed to take a different approach and enrolled Theresa in a personalized medicine study. During this study, doctors removed and analyzed Theresa's tumors and matched them to more than 200 different drugs that could affect her tumors. Because of this personalized approach, doctors found that a unique surgery would be the best treatment option.

They were able to remove part of Theresa's leg and attach her ankle joint to her knee while still maintaining joint function. Theresa's surgery was a success, helping her maintain quality of life and continue doing some of the things she loves.

“FUNDING FROM FOUR DIAMONDS HAS SAVED CHILDREN'S LIVES and will definitely save children's lives in the future. Every dollar matters because there is still more work to do.”

DR. VALERIE BROWN, FOUR DIAMONDS RESEARCHER

NEW PROGRAMS

ENHANCE SUPPORT FOR FAMILIES



New art therapy program offers patients a therapeutic experience.

Art therapy empowers patients to use art to help in their healing process. Four Diamonds helped bring a new art therapy program to patients and families undergoing treatment for childhood cancers.

Art therapy works to engage the mind and body in order to:

- support coping with hospital experiences
- provide a safe outlet for emotional expression
- promote feelings of control
- instill resiliency and relaxation

A Four Diamonds mom says her daughter has always been quiet, but since she started treatments she's been even more quiet and reserved. Having an art therapist has helped her express herself with art and use it as a coping mechanism.

New Parent Mentor program connects families fighting childhood cancer.

Childhood cancer parents understand what other parents are going through, in a way no one else can understand. Because of that, families advocated for a new Parent Mentor program, which matches parents of survivors with new families to offer guidance and support during their child's cancer journey.

Four Diamonds funds this program and a new program manager to expand support and programs for childhood cancer parents, patients and bereaved families.

As an example, the newly launched Caregiver Connect newsletter provides guidance on common questions and challenges.



Four Diamonds child Charlie during active treatment

“My son, Charlie, was diagnosed with Rhabdomyosarcoma at 16 months old, and our lives were turned upside down. I found comfort in the relationships I developed with other cancer moms who could relate to my fears and my struggle to adjust to our ‘new normal.’ I look forward to connecting with other families and offering the support they need.”

ANNE BEECHER, FOUR DIAMONDS MOM AND NEWLY TRAINED MENTOR

FOUR DIAMONDS FINANCIALS JULY 1, 2017 – JUNE 30, 2018



Each spring, a robust grant process allocates all dollars raised that year by Four Diamonds to be used in the coming fiscal year to further our goal to conquer childhood cancer. All requests are evaluated on the guidelines established in the original gift agreement by the co-founders of Four Diamonds.

The first priority in funding is to ensure that every Four Diamonds child receives the highest quality of life-saving childhood cancer care at our Children’s Hospital without ever seeing a bill for that care. This compassionate process relieves the financial pressure for families by covering 100 percent of all medical expenses related to cancer care not covered by insurance for eligible Four Diamonds children.

The next funding priority is to ensure every Four Diamonds child and their family are wrapped in comprehensive support services. This includes providing access to top-notch specialists proven to enhance positive treatment outcomes combined with support services to meet their physical, emotional, social and spiritual needs.

After these two funding priorities are met, grants are made to a variety of innovative research projects to better understand why and how childhood cancer happens, and new ways it can be treated. Funds are also invested in endowments. The interest earned on those endowments creates a secondary, permanent funding stream for our ongoing research efforts in pursuit of a cure for all childhood cancers.



Four Diamonds child Aubrey

2017-2018 in numbers

Summary of Sources and Uses of Funds

Sources of Funds

Philanthropic gifts received between July 1, 2017 - June 30, 2018

THON	\$10,385,695.97
Mini-THON	\$7,035,738.55
OTHER	\$813,024.85
MEMORIAL GIFTS	\$77,765.62
HONOR GIFTS	\$23,617.50
TOTAL	\$18,335,842.49

Uses of Funds

Funds allocated for use between July 1, 2017 - June 30, 2018

Available funds for allocation are comprised of all funds raised between July 1, 2016 - June 30, 2017, and all previously allocated funds that were unspent during that timeframe.

Patient Care and Family Support

Patient Care	\$2,949,993.10
Family Support	\$951,267.26

Research

Research Grants	\$1,471,121.22
Research Support	\$4,339,357.66

Investment in Research Endowments

Epigenetics	\$9,000,000.00
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Administrative Expenses \$2,391,247.81

TOTAL USES OF FUNDS \$21,102,987.05

87 cents
OF EVERY DOLLAR

directly impacts children fighting cancer today and helps improve the path for kids who will face cancer in the future.



4,000

families helped since 1972

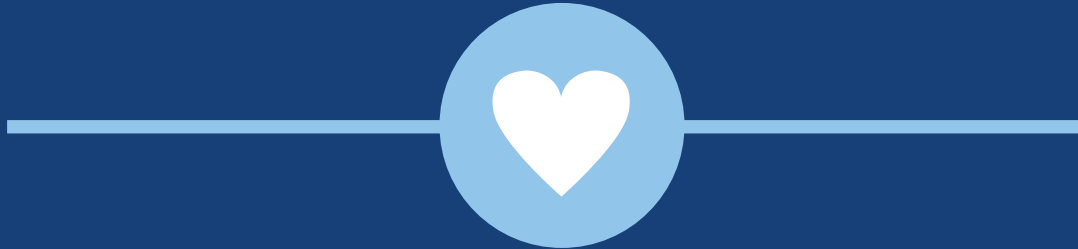


100,000+

student volunteers each year



OUR PARTNERS IN THE FIGHT™



STUDENTS SAVING LIVES



Penn State Dance Marathon (THON™)

Michael Palm was six years old when he was diagnosed with cancer. Thanks in part to the 41-year partnership between THON and Four Diamonds, all of Michael's hospital costs were taken care of and his family could focus on loving and taking care of their son. Now a student at Penn State University, Michael is giving back to the same organization that helped save his life.

Last year, 16,500 Penn State University students contributed 5 million volunteer hours to THON, continuing their tradition of the most successful dance marathon in the world and raising more than \$10 million For The Kids™.



Four Diamonds child Michael at THON 2017



Four Diamonds child Michael during active treatment

“THON is the ‘good’ that came out of something bad that happened to our son and our family. We are so thankful to have all of the THON students fighting for all the kids and for us.”

BARB, FOUR DIAMONDS MOM

MOBILIZING

A YOUTH REVOLUTION FOR GOOD™



Lower Moreland High School Mini-THON

Four Diamonds Mini-THON®

Inspired by THON, Mini-THON empowers students to find their voice and create a culture of helping others and giving back to their communities.

During the 2017-2018 school year, more than 90,000 students at 283 schools in eight states raised more than \$7 million to help conquer childhood cancer. This exciting program is building the next generation of leaders and philanthropists.

Rhea Sullivan is one of those leaders. She was the chair of her Mini-THON at Hempfield High School, graduated from Penn State, was a research intern at Hershey Medical Center and is now a new student at Penn State College of Medicine. Rhea speaks to how her experiences through Four Diamonds helped shape her passion for philanthropy and medical research.

“Participating in my high school’s Mini-THON ignited my interest in a career in biomedical pediatric neurology research. I am forever inspired by Four Diamonds.”

**RHEA SULLIVAN, MINI-THON ALUM
AND CURRENT MEDICAL STUDENT**



Rhea Sullivan

COMMUNITY JOINS OUR FIGHT



Team FTK®

Four Diamonds launched Team FTK® to unite the many individuals, students, families, community members and corporate partners who actively support our quest to conquer childhood cancer by hosting the following types of fundraisers to benefit Four Diamonds:

- Corporate employee giving with events like dress down days
- Asking loved ones to make a gift in honor of their birthday, graduation or wedding
- Hosting virtual fundraising events at colleges across the region
- Corporate golf and auction events to engage customers and vendors
- Honoring loved ones through tribute fundraisers

TEAM FTK FUNDRAISERS AND THE CONTRIBUTIONS FROM INDIVIDUAL AND CORPORATE GIFTS, COMMUNITY FUNDRAISERS AND GIFTS IN HONOR OF A LOVED ONE TOTALED MORE THAN \$900,000.

Every gift gives hope to families fighting childhood cancer, making it possible for Four Diamonds to help thousands of children.



help
fight
CANCER

HELP
KIDS
FIGHT
CANCER

TAKE A STAND
FOR THE KIDS

Help
fight
CANCER

GO
RAIDERS

HELP KIDS
CANCER
ALL PROCEED
TO THE
DIAMONDS



Four Diamonds

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FOUR  **DIAMONDS**
— Conquering Childhood Cancer —



PennState Health
Children's Hospital