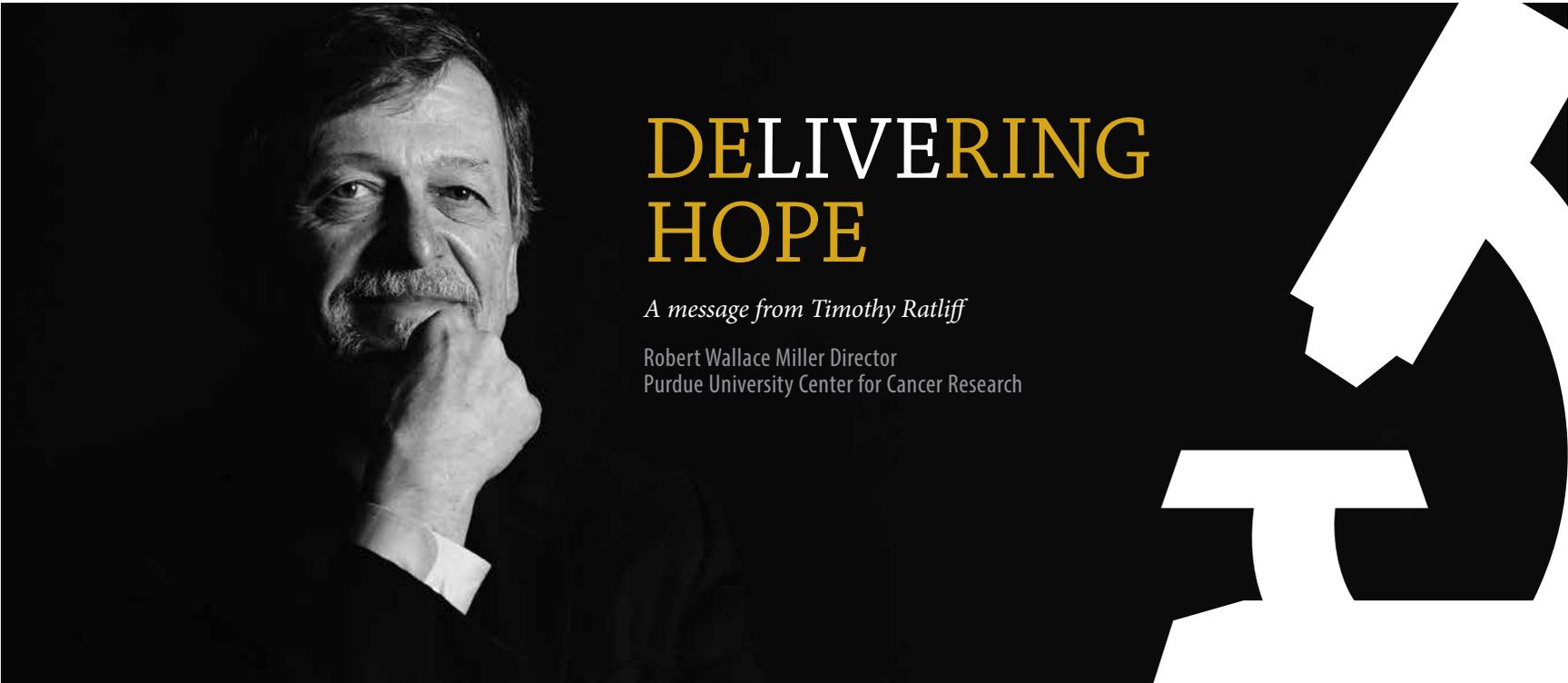


DECADES OF DELIVERING

2018 MARKS THE PURDUE CENTER FOR CANCER RESEARCH'S 40TH YEAR AS A NATIONAL CANCER INSTITUTE MEMBER INSTITUTION.

THE CENTER IS COMMEMORATING ITS RELATIONSHIP WITH THE NCI, A WORLD LEADER IN CANCER RESEARCH FUNDING, BY RENEWING ITS DETERMINATION TO ADVANCE THE FIGHT AGAINST CANCER THROUGH INNOVATIVE, CROSS-DISCIPLINARY RESEARCH AIMED AT IMPROVING CANCER PREVENTION, DIAGNOSIS AND TREATMENT.



DELIVERING HOPE

A message from Timothy Ratliff

Robert Wallace Miller Director
Purdue University Center for Cancer Research

The Purdue Center for Cancer Research is pleased to proclaim its 40th anniversary as a National Cancer Institute (NCI)-designated basic science cancer center and to celebrate the life-changing research of its talented scientists.

For more than 40 years, researchers at Purdue have strived to advance cancer prevention, detection, diagnosis and treatment. More than 14 million people in the U.S. have a history of cancer, and, according to the NCI, more

than 1 million new cases will be diagnosed this year. I lost both my father and father-in-law to cancer, and I have been diagnosed with and treated for prostate cancer. Most of our faculty also have been touched by cancer, and we all are

committed to eliminating the threat of dying of cancer.

The PCCR has served to integrate the strengths of the University and provide the resources necessary for success in cancer

research. We want to encourage new ideas and eliminate any hurdles or gaps in the path from research concept to a tool or treatment available to patients.

We are fortunate to have had help from individuals, organizations, the University and federal agencies in providing this support. To that end, the Indianapolis-based Walther Cancer Foundation has generously presented the PCCR with a \$10 million matching-funds gift for the creation of endowments that will help secure the center's future.

The value of gifts earmarked for this purpose will be doubled by the matching funds. Our goals are to create multiple endowments for named chairs that will attract or retain top talent; a graduate training endowment that will sustain student fellowships; and a general-fund endowment to support research that enables the pursuit of new ideas that could

lead to discoveries that change the course of cancer detection and treatment.

Knowing that we can count on regular funding from these endowments will allow us to expand our team of talented scientists, invest in more research projects that could lead to the next new treatment or technology, and support the next generation of cancer researchers.

Ever since the loss of my father and father-in-law while I was in graduate school, I have wanted to improve cancer treatment. With the progression of my own career, I've realized that the translation of basic research discoveries into new diagnostic technologies and therapeutics is the way to achieve my goal. That's what this center does best: It translates ideas into innovations that improve lives.

Our mission is basic discovery that fosters innovative cancer treatments. Our goal is to cure cancer.

“
KNOWING THAT WE CAN
COUNT ON REGULAR
FUNDING FROM THESE
ENDOWMENTS WILL
ALLOW US TO EXPAND
OUR TEAM OF TALENTED
SCIENTISTS, INVEST
IN MORE RESEARCH
PROJECTS THAT COULD
LEAD TO THE NEXT
NEW TREATMENT OR
TECHNOLOGY, AND
SUPPORT THE NEXT
GENERATION OF CANCER
RESEARCHERS.

”

Out of thousands of cancer facilities in the nation, the PCCR is one of only seven that have earned NCI designation as basic science cancer centers.

This prestigious designation shows that the NCI has the utmost confidence in our expertise and ability to achieve our research goals. We have worked with determination and passion to quickly translate ideas into tools and treatments for cancer patients for more than 40 years, and we continue to pursue discoveries that will change the future for our families.

MICHAEL CHILDRESS

UNITING DISCIPLINES
IN A QUEST FOR
UNDERSTANDING

Michael Childress originally wanted to be a veterinarian of the traditional kind. Now, he's at the cutting edge of medicine, uniting academic disciplines in a quest to better understand cancer and improve its treatment.

Childress is co-section head of oncology at the Purdue Comparative Oncology Program and an associate professor of comparative oncology in the College of Veterinary Medicine. Through his research on cancer in dogs, he studies the possible genetic underpinnings of cancer and conducts clinical trials aimed at improving cancer therapeutics for both animals and humans.

"I mostly study canine lymphoma, with two goals in mind: identifying new biomarkers and developing new therapies," Childress says. "It has become increasingly clear that lymphomas in dogs are very similar biologically to non-

Hodgkin lymphomas in people. So, by learning how to treat dogs, we begin understanding how to treat people."

Childress' journey from veterinary school to the PCCR has been full of surprises.

"When I went into veterinary medicine, I had absolutely no idea this kind of career even existed. My plan was to be an old-school veterinarian with a private practice," he says. "As I went through veterinary school, this world opened up to me — a world of discovery and opportunity, with the potential to do things that are possibly much more impactful on a wider scale. I have an opportunity to help populations of animals and of people."

Childress' research often results in unique academic partnerships. He recently teamed with Purdue colleagues in physics and basic medical

sciences to test a new method for predicting patient response to various cancer-treatment drugs that uses Doppler light-scattering technology.

Regularly used for weather radars, Doppler technology allows researchers to study the interaction between living tissue samples and cancer drugs by charting changes in intracellular motion. This way, they can determine a patient's response to chemotherapy drugs before treatment begins.

"I'm fortunate to be involved in a lot of translational research projects," Childress says. "That's one of the really rewarding things about working in an environment like the one I work in. I'm continually challenged and presented with opportunities to make an impact."

"AS I WENT THROUGH VETERINARY SCHOOL, THIS WORLD OPENED UP TO ME — A WORLD OF DISCOVERY AND OPPORTUNITY, WITH THE POTENTIAL TO DO THINGS THAT ARE POSSIBLY MUCH MORE IMPACTFUL ON A WIDER SCALE."





“CANCER IS A SIMPLE NAME BUT, INTRINSICALLY, IT’S A VERY COMPLICATED DISEASE. THAT’S WHAT MAKES RESEARCH SO INTERESTING AND IMPORTANT.”

DANZHOU YANG

WORKING OVERTIME
IN SEARCH OF A CURE

Professor, researcher, cancer center chair, associate dean. Danzhou Yang is busy. But she has found a way to make it all happen: work harder.

Yang, the Martha and Fred Borch Chair in Cancer Therapeutics and professor of medicinal chemistry and molecular pharmacology, joined Purdue in 2016. In 2017, she was named associate dean for graduate programs in the College of Pharmacy. Although the appointment came as a surprise to her, Yang tackles her multiple responsibilities with enthusiasm.

Administration is part of Yang’s job, but her primary focus is cutting-edge research and technology for designing new anticancer drugs.

“I came to Purdue because it was a good fit for my research interests. Being named as a dean was not necessarily part of my plan. I’ve had to balance things very carefully,” Yang says. “But

things are at a very good point. My kids are grown, giving me more time to work. I work on the weekends and at night.”

Yang’s work is based on two developments in cancer research. The first is the emergence of cancer-specific DNA molecular targets, such as G-quadruplexes, as a new frontier for drug development. Structure-based rational drug design of small molecules that target cancer-specific DNA molecular targets is a fundamental part of her research.

The second development is in structure-function studies of the emerging biologically important DNA secondary structures and associated proteins. These studies are performed using high-field nuclear magnetic resonance spectroscopy in combination with other structural and biological methods.

The aim of Yang’s research is to combine the potency of DNA-interactive anticancer compounds with the selectivity properties of molecular-targeted approaches to create innovative anticancer therapeutics. With the help of NMR spectroscopy and structural biology, Yang is studying the functions, protein interactions and drug targeting of DNA secondary structures such as G-quadruplexes.

“This is a very new and exciting area. We are really trying to understand the full picture of the biological functions of these structures so we can design future cancer drugs,” Yang says. “Now is an exciting time for cancer research. The impact on society from cancer is huge, and we’ve been pursuing a cure for many years. Cancer is a simple name but, intrinsically, it’s a very complicated disease. That’s what makes research so interesting and important.”

YOU-YEON WON

MAKING
BREAKTHROUGHS
WITH NANOMEDICINE

You-Yeon Won, a professor of chemical engineering, has done research in nanomedicine for 15 years. There is a reason for his persistence: potential.

Much of Won's work revolves around the cancer-treatment potential of nanoparticles like polymer lipids. As drug-delivery systems, polymers and other drug-encapsulating nanoparticles are promising avenues for maximizing drug availability within tumors while minimizing exposure of other tissues to the drug. These types of systems offer more pharmacokinetic control than traditional chemotherapy.

"We have been working on developing and studying medical nanomaterials for cancer therapy and imaging for some years now," Won says. "Polymers are used as controlled release agents in all our projects. Our current research focuses on intratumoral

injectable nanoparticles that have both polymer and inorganic components, and I'm confident that this technology holds significant potential for clinical application."

One of Won's recent breakthroughs is in a treatment for head and neck cancer, which is diagnosed in 60,000 people each year. He developed a radiation-controlled drug-release formulation that improves this treatment by encapsulating the drug in polymer-based protective capsules and injecting it into the tumor before normal radiotherapy is done.

"Using this formulation, an uncontrolled initial burst-release of toxic chemotherapy drugs can be avoided," Won says. "Radiation can be used to control the intratumoral drug availability in a manner that has not previously been possible. Radiation triggers rapid drug release from nanoparticles. The safety and

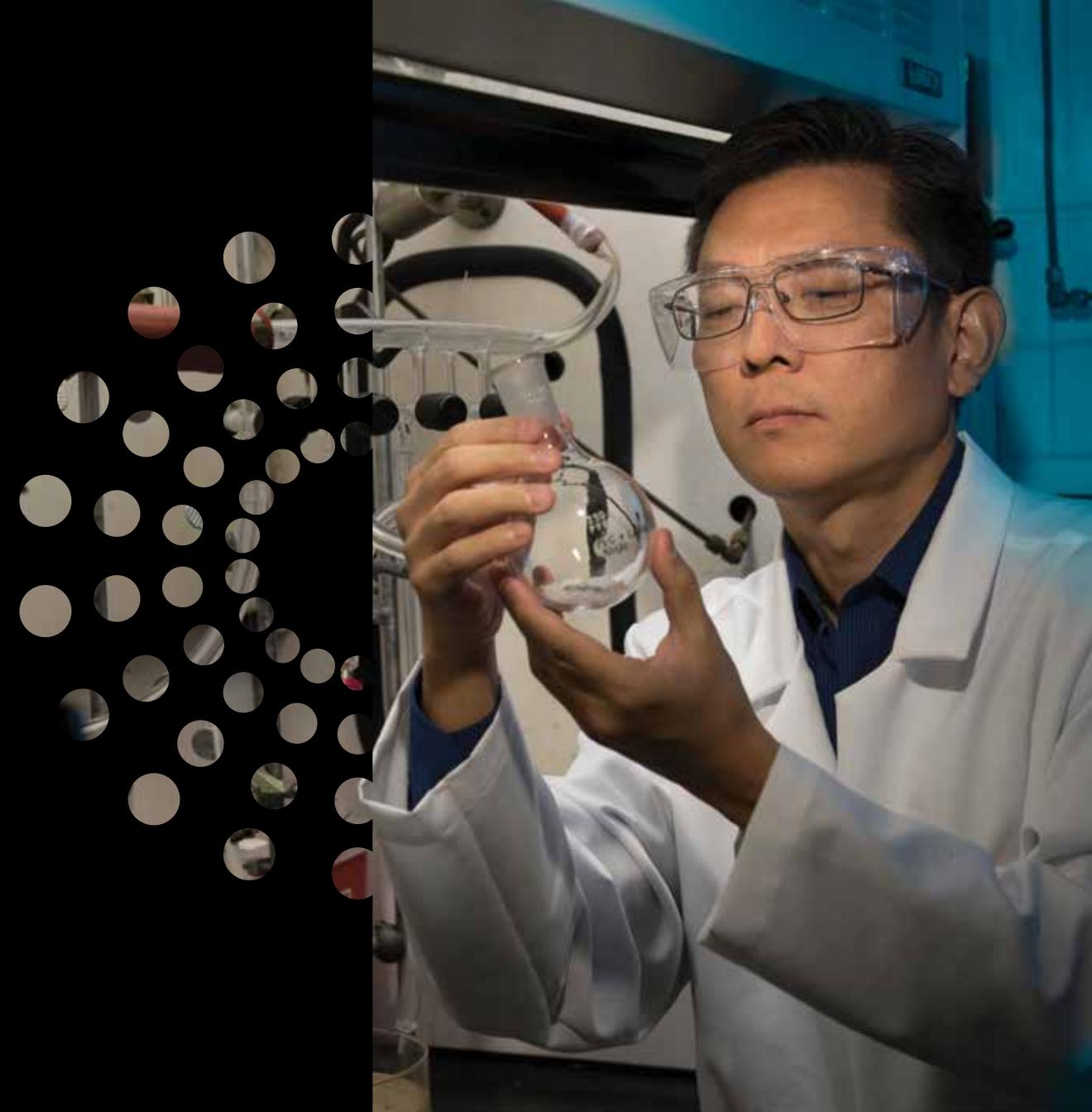
efficacy of this formulation have been validated in the lab, and further work is ongoing."

This promising method recently earned Won a \$20,000 grant from the Purdue-managed Trask Innovation Fund. The Trask Fund serves as a development mechanism to help faculty commercialize potential technologies, with assistance from Purdue's Office of Technology Commercialization.

Won has formed a startup company, Lodos Theranostics, with the help of those funds. His company conducts preclinical studies with his innovative technology.

"I formed the company to help drive clinical translation of this and related innovations from my laboratory," Won says. "None of this work would have been possible without the great help and support from the PCCR and the funding opportunities it offers."

"OUR CURRENT
RESEARCH FOCUSES
ON INTRATUMORAL
INJECTABLE
NANOPARTICLES THAT
HAVE BOTH POLYMER
AND INORGANIC
COMPONENTS, AND
I'M CONFIDENT THAT
THIS TECHNOLOGY
HOLDS SIGNIFICANT
POTENTIAL FOR
CLINICAL APPLICATION."



the CHALLENGE

For the past 11 years, the Purdue Center for Cancer Research has raised awareness and much-needed funds through The Challenge, a 5K run/walk. The race, which has generated more than \$800,000 in all, reminds the community that Purdue cancer research provides hope to survivors. And for many, the race is an opportunity to honor loved ones lost to or fighting cancer.

With a record number of participants and sponsors, the 2018 event attracted more than

2,200 participants and raised over \$120,000. This year, a new race route included a finish at Ross-Ade Stadium, where participants and spectators could watch the finish line and see the names of participating cancer survivors on the stadium's jumbotron.

Purdue football coach Jeff Brohm and members of the team kicked off the event and then cheered participants to the finish at Ross-Ade. Participants enjoyed the opportunity to take pictures with players and walk on the field

after the race. Next year's event is planned for April 13.

Each year, proceeds from the race are awarded to PCCR researchers exploring new and innovative research. This year's recipients included:

R. TIMOTHY BENTLEY
Associate Professor of Neurology and Neurosurgery

R. GRAHAM COOKS
Henry Bohn Hass Distinguished Professor of Chemistry

DAVID THOMPSON
Professor of Chemistry



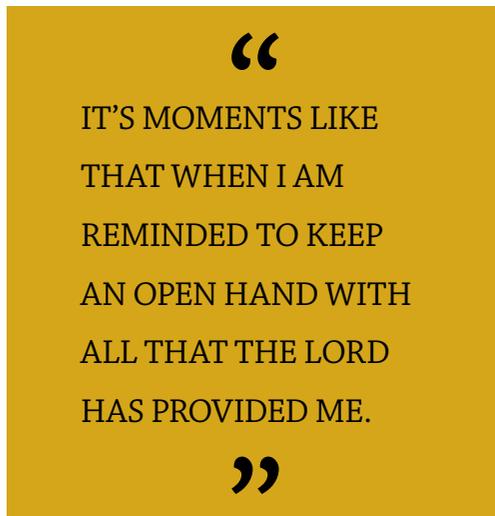
2,200
PARTICIPANTS
\$120,000+
RAISED





JOY MATSON

On a Mission to Give



“
IT'S MOMENTS LIKE
THAT WHEN I AM
REMINDED TO KEEP
AN OPEN HAND WITH
ALL THAT THE LORD
HAS PROVIDED ME.
”

Joy Matson is certain about one thing: Her money is meant for a greater and higher good. She has dedicated her life to pleasing and serving the Lord with her time and material blessings. It is her Christian belief that she serves as a steward of the Lord's money, recognizing that her money is not her own.

“I owe all my financial gain to God,” Matson says. “That's how I look at it.”

It's a matter-of-fact statement from Matson, who is certain that philanthropy is integral to a fruitful and successful life. Whether it is through her job as a mortgage loan specialist at Purdue Federal Credit Union or as a community philanthropist, Matson proves how vitally important it is to give.

It will come as no surprise to anyone who has met her that Matson was among the first to act when the Walther Cancer Foundation presented a unique opportunity to support cancer research. In 2017, the foundation gave

the PCCR a \$10 million matching-funds gift to be fulfilled in seven years.

“This was a once-in-a-lifetime opportunity,” Matson says. “The gift cannot be deferred, so there's a sense of urgency.”

Even though there are more than 100 researchers at the PCCR, Matson knows or is familiar with almost all of them. She corresponds with researchers regularly and frequently invites them to dinner parties at her home. In one dinner conversation, Purdue cancer pharmacology professor Sophie Lelièvre described her research and a hunch she had about it. Matson was so inspired that she offered professor Lelièvre seed money to follow that hunch.

Matson says. “It's moments like that when I am reminded to keep an open hand with all that the Lord has provided me. I try to be nimble and to make strategic giving decisions that I believe will honor the Lord and help others.”



ZETA TAU ALPHA

Leading the Way in Student Awareness

The Zeta Tau Alpha sorority illustrates how Purdue's Greek life can make a positive impact on the community and the world.

Kayla Halterman (left) and Anna Schultz (right), seniors and Zeta sisters, are spearheading their organization's effort to fight generalizations about Greek culture through a continued dedication to worthy causes like cancer research. With gifts totaling almost \$150,000 over the past five years, Zeta Tau Alpha has led the way in student giving to the Purdue Center for Cancer Research.

The journey from sorority sister to philanthropist is one in the same for the two Zetas since their legacy for giving is handed down through mentorship. Shultz saw this to be true; one of her mentors was a victim of breast cancer.

“We are honored to provide our fellow students the chance to change society's opinions of Greek life by fighting for a cause that affects so many,” Halterman says. “We love giving to the PCCR because it keeps our funds local and enables us to serve the Purdue community.”

The annual Big Man on Campus contest is Zeta Tau Alpha's most popular philanthropic event. The all-male talent contest, which fills a 6,000-seat auditorium, raises funds and awareness for breast cancer research.

Zeta Tau Alpha is an international sorority that emphasizes leadership, service and academic achievement. Halterman and Schultz hope that the Purdue chapter will serve as an example of how all students can be part of the future of cancer research.

NCI DIRECTOR VISITS PCCR FOR FIRST TIME



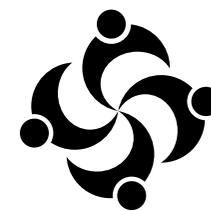
The Purdue Center for Cancer Research celebrated a landmark occasion when, in summer 2017, it hosted a National Cancer Institute (NCI) director for the first time in its history.

Douglas Lowy, MD, now deputy director of the NCI, was acting director at the time of his visit. He spoke about several of NCI's efforts in cancer research, including the current national policy on biomedical research, the tremendous strides made by the Cancer Moonshot Initiative and the NCI Experimental Therapeutics Program (NExT), and how centers like the PCCR are working to solve the cancer problem through these and other programs.

The PCCR, currently celebrating its 40th anniversary as an NCI-designated basic science cancer center, is one of the 70 members of the NCI's Cancer Centers Program.

One of the anchors of our nation's ongoing cancer research effort, the program and its member centers form the backbone of NCI's mission to study, understand and control cancer. At any given time, cancer centers like the PCCR have hundreds of research studies underway, each of which has the potential to be life-changing — and life-saving.

PCCR faculty and staff were pleased with Dr. Lowy's visit to our facility. We are deeply grateful for the efforts he and others at the NCI have made as we strive, together, to advance cancer prevention, detection, diagnosis and treatment.



WALTHER
CANCER
FOUNDATION

Providing Continued Support

The Walther Cancer Foundation is a private grant-making foundation that supports and promotes interdisciplinary and inter-institutional cancer research at the Purdue Center for Cancer Research and similar institutions.

The Indianapolis-based foundation has two primary goals: to support cancer research with the aim of discovering better treatments, if not cures, and to develop a comprehensive approach for supporting both patients with cancer and their families. Since its founding, the Walther Cancer Foundation has invested almost \$140 million in cancer-focused research.



PURDUE.EDU/
CANCERRESEARCH/40

Over the years, the PCCR has received more than \$16 million in research grants from the foundation, including a \$10 million matching-funds gift in 2017. In part, this gift was designed to inspire more endowed gifts to help sustain the center.

"We couldn't be more grateful to the Walther Foundation," Purdue President Mitch Daniels says. "Nor could we be more proud of the work being done at our cancer center, which has generated 10 potential drugs in clinical trials, with 31 drugs in the pipeline, and developed technology that has created 15 startup companies over the last seven years."

Under the direction of Timothy Ratliff, the Robert Wallace Miller Director of the PCCR, the recent funds-matching gift from Walther will be available for a variety of needs. These include faculty recruitment, faculty retention and needed equipment. The gift also will help fund research in such areas as drug discovery and development; breast, pancreatic, prostate, and other forms of cancer; and the role obesity plays in the disease.

**\$140
MILLION**

INVESTED IN
CANCER-FOCUSED
RESEARCH

10

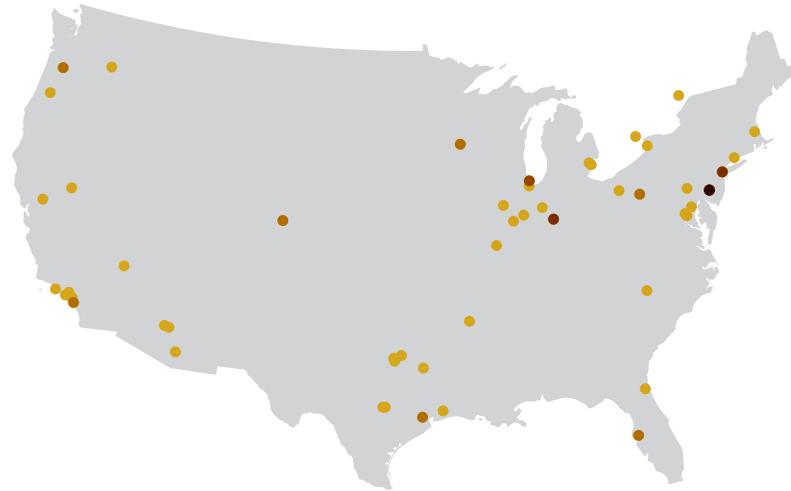
POTENTIAL DRUGS IN
CLINICAL TRIALS

31

DRUGS IN
THE PIPELINE

PCCR RESEARCH SPANS THE GLOBE

Cancer research at Purdue has led to the development of drugs in clinical trials throughout the world. Potential treatments for prostate, lymphoma, ovarian, bladder and renal cancers have stemmed from PCCR work and successfully made their way to 221 human clinical trials — in 15 countries. Cancer crosses borders and spans the globe, and international collaboration is the key to its cure. The future of cancer treatment is bright because of the discoveries made here and the clinical partnerships we have fostered throughout the world.



UNITED STATES + CANADA



Total **73 CLINICAL TRIALS**

Little Rock, AK; Mesa, AZ; Scottsdale, AZ; Tucson, AZ; Burbank, CA; Los Angeles, CA; Orange, CA; Oxnard, CA; Sacramento, CA; Santa Monica, CA; Whittier, CA; New Haven, CT; Denver, CO; Washington, D.C.; Jacksonville, FL; Tampa, FL; Chicago, IL; Decatur, IL; Harvey, IL; Peoria, IL; Urbana, IL; Indianapolis, IN; Lafayette, IN; Boston, MA; Baltimore, MD; Bethesda, MD; Detroit, MI; Southfield, MI; Rochester, MN; St. Louis, MO; Concord, NC; Las Vegas, NV; Reno, NV; Buffalo, NY; New York, NY; Canton, OH; Eugene, OR; Portland, OR; Hershey, PA; Philadelphia, PA; Pittsburgh, PA; Arlington, TX; Austin, TX; Beaumont, TX; Bedford, TX; Houston, TX; Plano, TX; Tyler, TX; Kennewick, WA; Ottawa, Ontario; Toronto, Ontario

RUSSIA



Total **27 CLINICAL TRIALS**



EUROPE



Total **119 CLINICAL TRIALS**

Bulgaria; Czech Republic; France; Germany; Hungary; Italy; Netherlands; Poland; Romania; Spain; United Kingdom



AUSTRALIA



Total **2 CLINICAL TRIALS**



NUMBER OF CLINICAL TRIALS



INVESTING IN RESEARCH

Fiscal year 2017-18 was a remarkable one for the PCCR in terms of gifts received, funds raised and awards distributed. Whereas the Walther Cancer Foundation presented the center with a \$10 million funds-matching gift, which has already raised \$1.6 million, the center distributed nearly \$677,000 in awards across four core research areas.

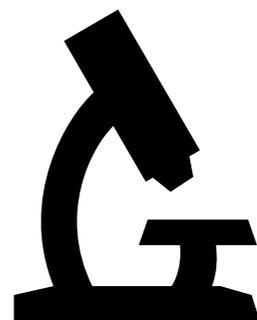


CELL IDENTITY + SIGNALING



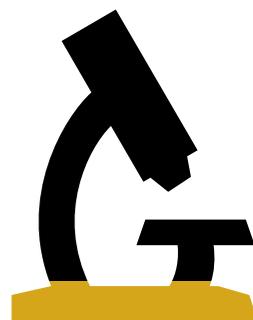
■ Research Awards **\$105,292**
■ Student Awards **\$76,688**
Total \$181,980

CHEMICAL + STRUCTURAL BIOLOGY



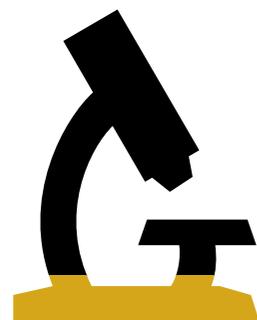
■ Research Awards **\$108,000**
Total \$108,000

DRUG DELIVERY + MOLECULAR SENSING

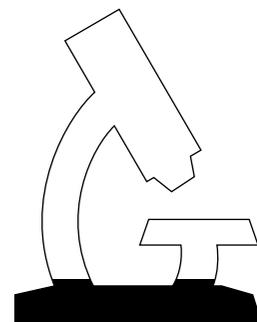


■ Research Awards **\$65,184**
■ Student Awards **\$10,000**
Total \$75,184

MEDICINAL CHEMISTRY



■ Research Awards **\$264,590**
■ Student Awards **\$47,144**
Total \$311,734



■ Amount Raised
\$1.6 MILLION

A YEAR TO REMEMBER

A message from Don Dunaway

PCCR Director's Advancement Board Chair

What an amazing year! Completing the PCCR's first 40 years as a leading NCI-designated basic-research cancer center and being truly honored by a \$10 million matching-funds gift from the Walther Cancer Foundation!

As a board member, I'm completing my fifth year on the board and my second year as chair. I am honored to be a cheerleader for the PCCR team. It's been a special privilege to serve under Director Tim Ratliff, whose leadership has helped develop the center to 19 departments and 118 researchers.

I've had the opportunity to get to know several of the brilliant cancer researchers on the PCCR team. This team combines profoundly impressive intellectual and technical skills with a compelling emotional commitment to conquering cancer. This combination of intellectual vigor and passion to advance cancer research is what makes the PCCR so special. It's my judgment

that the PCCR is a unique organization that will continue to be a significant source of major advancements in cancer-defeating tools.

With Director Ratliff's guidance, I've had several opportunities to fund specific projects that target potentially innovative ideas. These targeted projects, named Tim's Twigs, provide funding to research that may not have been supported otherwise. I think you would be amazed by the volume of patient-positive ideas waiting in the pipeline. As both a board member and donor, I've seen firsthand the incredible achievements made by the PCCR team.

It comes as no surprise that the PCCR succeeds because of YOU. Your critical support is what makes the center shine!

A tremendous thank you to all of the donors who make our research achievements possible.

