



PURDUE UNIVERSITY
CENTER FOR CANCER RESEARCH

LAUNCHING DISCOVERIES

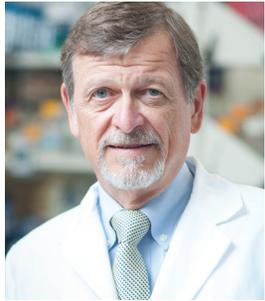
ANNUAL REPORT 2016



The Purdue University Center for Cancer Research focuses on basic discovery, the foundation for innovative cancer solutions. One of only seven centers in the United States designated by the National Cancer Institute as a basic cancer center, we bring together more than 100 researchers from across the university, along with collaborators around the world, to share ideas, insights and findings.

Leveraging Purdue's strengths in engineering, veterinary medicine, nutrition science, analytical chemistry, medicinal chemistry, pharmacy, structural biology and biological sciences, we focus on research areas such as cell identity and signaling, chemical and structural biology, drug delivery and molecular sensing, and medicinal chemistry. Five discovery groups focus on bladder, brain, breast and prostate cancer, and the relationship between cancer and obesity.

WELCOME



Purdue University — the cradle of astronauts and alma mater of the first and last men to set their feet on the moon — is playing a role in another national moonshot initiative. But instead of sending more people into space, this effort is intended to double the rate of progress in cancer prevention, diagnosis, treatment and care over the next five years.

In his last State of the Union address, President Barack Obama tasked Vice President Joe Biden to lead a national \$1 billion initiative called the Cancer Moonshot. In just half a decade, Obama and Biden hope that the United States can make ten years' worth of progress on the research front.

As part of the initiative, the Purdue University Center for Cancer Research hosted a Cancer Moonshot Summit this summer at the Neil Armstrong Hall of Engineering. Our summit was one of hundreds held across the nation that day, including one in Washington, D.C., convened by Vice President Biden.

"Just as we did with the space race, Purdue has the right people, the right minds to fight this war on cancer," said astronaut and Purdue alumnus David Wolf, who spoke at Purdue's event. "It will take a collaborative effort, and Purdue is bringing researchers from different fields together to come up with the right answers."

Cancer is about individual people, but it's also about billions of people — the patients, the family members, the scientists, and the physicians and other caregivers. It's also intensely personal, and yet in many ways public. Using social media or traditional media, or talking one-on-one or in large groups, cancer survivors are speaking out on the need for more and better ways to treat this horrible disease.

Terry Kix is one of those advocates. Director of operations for Purdue Women's Basketball, she was diagnosed with stage 3 stomach cancer in 2012. For six weeks as the basketball season heated up, Kix spent from 8 in the morning until 6 at night three times a week enduring an aggressive chemotherapy regimen. Once the tumor had shrunk from five centimeters to the size of a dime, surgeons could easily remove it.

"We are saving lives," said Kix at the event, nearly four years after her diagnosis. But, she added, there's more work to be done. "We have to do whatever we can to support the initiatives here, because it matters."

Vice President Biden, who lost his own son to cancer a year ago, has dedicated his final year in office to bringing together the brightest minds to find new solutions. The Cancer Moonshot "is about not giving up hope and having the urgency of now," he said.

To quote the hashtag associated with this grand initiative, we all #CanServe. Whether you're a cancer survivor, a loved one, a scientist, a provider or simply someone who wants to help, I urge you to give of your time and your gifts to this great cause.

A handwritten signature in black ink that reads "Timothy L. Ratliff". The signature is fluid and cursive.

Timothy L. Ratliff
Robert Wallace Miller Director



Tim Ratliff speaks at Purdue's Cancer Moonshot Summit in Armstrong Hall.



CLAUDIO AGUILAR

It was a chilly Saturday morning in April 2015, and Claudio Aguilar, an associate professor of biological sciences, was standing outside Ross-Ade Stadium as pre-race festivities got underway for the Challenge 5K Run/Walk.

"The Cancer Center had given us one of the Challenge research grants, and I was there on the stage as they introduced each of us and what we had been awarded for. After the ceremony ended, I was approached by a young lady who told me her mother had died of bladder cancer and she thanked me for my support," says Aguilar, who lost his own father to pancreatic cancer several years ago.

"Both of us stood there with tears in our eyes. That's what keeps us moving; the human connection is very important. Even when I don't have anybody in my family with this kind of cancer, to me I have this emotional, human touch."

The American Cancer Society estimates that in 2016, more than 58,000 men and 18,000 women in the United States will be diagnosed with bladder cancer, and more than 16,000 people will die from it. While most bladder tumors begin superficially, in around 70 percent of patients, bladder cancer returns, often more invasive and difficult to treat.

Bacillus Calmette-Guerin (BCG) has emerged as an effective treatment for early-stage bladder cancer, with doctors using a catheter to deliver the bacteria

directly into the bladder. Still, the treatment is uncomfortable, and patients can possibly develop a systemic, life-threatening infection.

Aguilar wondered if there was a way to replace treatment with live bacteria, so he teamed up with David Thompson, professor of organic chemistry, and Tim Ratliff, distinguished professor of comparative pathobiology and the Robert Wallace Miller Director of the Purdue University Center for Cancer Research. The team successfully programmed nanocarriers coated with BCG proteins to bind, penetrate and deliver anti-cancer drugs in cancer cells.

Aguilar is also collaborating with researchers at Harvard University and the Massachusetts Institute of Technology to develop novel anti-bladder cancer agents. One of his teammates is a survivor of bladder cancer. "He was very, very interested in collaborating with us," Aguilar says. "Hopefully he feels like he's making a difference."

After successfully testing one of the reagents in the lab against human tumor cells donated by collaborating hospitals, Aguilar worked with Debbie Knapp, the Dolores L. McCall Professor of Comparative Oncology and director of the Purdue Comparative Oncology Program, to treat dogs with naturally occurring bladder cancer. Results are very promising, and if further research bears out, human clinical trials may be possible within a few years.



OURANIA ANDRISANI

Hepatitis B infection isn't just an illness; Hepatitis B is also a viral carcinogen. For the 5 to 10 percent of people whose hepatitis B infection is not cured, liver cancer is likely to result 20 to 30 years down the road.

Here in the United States, we are largely protected through vaccination. But for people in Europe, Asia, India and Africa — especially in remote, underdeveloped areas where vaccines may be hard to come by — hepatitis B is a scourge that, if not successfully treated, can even be passed on to infants during childbirth.

Ourania Andrisani, who also used to study quail and chicken embryos to understand development of nerve cells, has for the past two decades been leveraging her knowledge of cell division to study how liver cancer results from the virus.

"Doctors can't do anything about these children, and anyone whose virus is never cured becomes a chronic carrier," says Andrisani, professor of basic medical sciences. "There is a very significant need in the world for new ways to treat both the infection by the virus and also the resulting liver cancer."

Because cell behaviors are regulated by different pathways, Andrisani is comparing healthy liver cells to ones infected by the virus, in order to identify behaviors that only occur when the virus is present. "If the virus activates a specific pathway, first, this pathway must be important for the virus to grow, and second,

it must contribute to the development of liver cancer," she says.

In a study published 12 years ago, Andrisani and her team discovered that the X protein that is made from the genetic material of the virus instructs infected liver cells to grow and divide. Slowly, over decades, the liver's genetic landscape becomes more and more damaged, and infected cells mutate into cancerous ones.

While Andrisani continues studying pathways, she and her team of graduate students and post-docs are also trying to identify molecules that could be targeted to block the growth of cancerous liver cells. "Although we are very far from a cure or development of new therapies for liver cancer, the first step is to know the players of the pathways and how they turn a normal cell into a cancerous one. Then, we will work with drug scientists and chemists who can think of ways to develop specific molecules that can target these pathways," she says.

The majority of chemotherapy drugs today can't differentiate between cancerous and healthy cells, which is why side effects like nausea, hair loss and even organ damage can result. "If we can understand the specific mechanisms of cancer cells, we can target just those, in select patients that have mutations in those pathways. This is the whole idea of personalized medicine."



NADIA ATALLAH

As the daughter of computer scientists, Nadia Atallah grew up amidst dinner conversations on information security, algorithms and parallel computation. And while she never felt pressured to follow in her family's footsteps (her sister is also in computer science), it's not surprising that Atallah ended up there, although via a circuitous route.

"In grad school, I mentioned I liked statistics, and my professor asked me to analyze RNA sequencing data," says Atallah, who was researching pheromonal control of plant development at Purdue. "As I did the project, I realized I needed to learn how to program."

Atallah also discovered how much she enjoyed data analysis. "I found I really clicked well with it. It came really easily to me and didn't feel like work," she says. "That's when I knew I wanted a career involving bioinformatics."

An interdisciplinary field that mixes computation with biology, bioinformatics is becoming increasingly important in cancer research for analyzing large data sets of DNA and RNA. "I'm working with terabytes of data," says Atallah — enough to fill hundreds of DVDs, way more than a single desktop computer could handle alone.

As the bioinformatician for a new bioinformatics core jointly run by the Purdue University Center for Cancer Research and the Indiana University Melvin and Bren Simon Cancer Center, Atallah works with a team to analyze cancer data sets. Sitting in her office in Purdue's Hansen Life Sciences Research Building, she

taps into Purdue's Snyder and Conte supercomputer clusters to work on projects like single-cell sequencing.

Less than a decade old, single cell sequencing is a tool that allows scientists to sequence the DNA or RNA in a single cell, investigating variations. "We can look for which genes are expressed in cancer cells that are not expressed in normal cells, or look at how the knock-down of one gene affects the expression of other genes at a cellular level," Atallah says. That requires a lot of data.

In one recent project, Atallah helped Tim Ratliff, distinguished professor of comparative pathobiology and the Robert Wallace Miller Director of the Purdue University Center for Cancer Research, compare RNA levels in prostate cancer cells before and after knock-down of a gene thought to be involved in carcinogenesis. In another with Scott Briggs, associate professor of biochemistry, she helped him analyze RNA in budding yeast to study the effects of environmental stress and genetic mutations.

Ultimately, the goal of the bioinformatics core is to help Purdue and IU cancer researchers gain a greater understanding of cancer and to find new treatments for cancer, Atallah says. That's a personal goal of hers as well. "I had a really close friend who passed away four years ago from bladder cancer. Now I've been involved in grant applications to perform work on bladder cancer data," she says. "Cancer is biologically really interesting and it's complicated, but it's also something meaningful. I had other job offers and I feel really good about doing this."



MARK CUSHMAN

Sitting in a University of California, San Francisco, lecture hall in the 1960s, Mark Cushman was much like his fellow pharmacy classmates: young, idealistic and eager to invent new medications to help people. Cushman's dreams, however, were quickly put to rest by a well-intentioned professor who warned that the chances of discovering a viable compound, finding someone to finance it, and getting all the way to FDA approval were next to impossible.

That was then. This is now.

Nearly 50 years after completing his Pharm.D. and 40 years after serendipitously creating promising new anti-cancer agents in his Purdue laboratory, two of Cushman's drugs — LMP400 (indotecan) and LMP776 (indimitecan) — have just passed phase 1 clinical trials. They're now headed into phase 2.

"We saw efficacy in some of the cancer patients, which was encouraging," says Cushman, distinguished professor of medicinal chemistry. "While not every single patient responded to the medications, those who did showed no cancer progression and fewer side effects than with traditional chemotherapy."

Drug discovery is a steep uphill climb. Current estimates indicate that only 1 in 10,000 drugs developed in the laboratory actually make it into the marketplace, and the total cost of developing a single successful drug is upwards of \$2.6 billion.

To better his own odds, Cushman has invested in Linus Oncology, the

company that has licensed his intellectual property. He also serves on its board. "This has given me access to National Cancer Institute clinical data that I wouldn't have had otherwise and has also allowed me to contribute to the success of the drug," he says.

But Linus has reached a critical juncture. The company needs to successfully negotiate with an international company to fund phase 2 trials, which would include mass-producing the drugs for a few hundred patients, recruiting physicians to administer the medications, and recording results.

If negotiations are successful, Linus will target Phase 2 trials at patients with particular types of cancer. Then, Cushman's drugs would have one more barrier to overcome. "Phase 3 would be for thousands of patients, and the company would have to work with many different clinics to have it trialed," he says. Even at that point, potential side effects could keep the drugs from being approved.

Meanwhile, Cushman is thrilled he's gotten this far. "The drugs have already helped 17 patients," he says. "For them to be approved and available to anyone with cancer, that would be beyond my wildest expectations."



EMILY DYKHUIZEN

Emily Dykhuizen considers herself lucky. “I haven’t known many people who’ve died young of cancer,” she says. “Those are some of the real tragedies, and often it happens very fast.”

But peering into the microscope at cancer cells every day, she spends a lot of time thinking about the personal stories behind the disease. Now that she’s a parent, she’s even more determined to discover new therapies for people she’s never met and for people who have yet to be diagnosed. “It really drives me to figure things out for the next generation, so that they won’t have so much suffering,” says Dykhuizen, an assistant professor of medicinal chemistry and molecular pharmacology.

Dykhuizen’s hope for new treatments lies in epigenetics, variations caused by environmental factors that can lead to cancer and other diseases. “We’re now realizing that epigenetic dysregulation is a huge driver of cancer and chemotherapy resistance,” she says. Because epigenetics don’t affect our underlying genetic code, they can potentially be reversed to halt the progression of cancer.

“We’re working on the whole spectrum,” she says. “The first part: when these epigenetic regulators are mutated or overexpressed, how do they change gene expression? And the second: what does that mean for treatment?”

Two kinds of cancers that appear to be promising targets for epigenetics

therapy are clear cell renal carcinoma, the most common type of kidney cancer, and glioblastoma, a highly invasive brain tumor. While the prognosis is usually good when clear cell carcinoma is diagnosed early, if it spreads beyond the kidneys before being detected, survival rates plummet.

Glioblastomas tend to grow rapidly. Nourished by blood vessels, they bury themselves deep in the brain, where they are nearly impossible to remove without causing brain damage. Long-term survival rates are very low. “The things that unite these two cancers is that both are resistant to chemotherapy,” Dykhuizen says.

Using genomic sequencing, a technique that analyzes gene regulation, and high-throughput screening, a process that rapidly assesses chemical structures to identify new drugs, Dykhuizen is studying how chromatin — a complex of DNA, RNA and proteins — affect cancer development.

“We’re hoping to understand how cancer cells harness these normal processes for bad essentially. That’s really the tragedy of cancer; cancer is our cells gone wrong,” she says.

Ultimately, that could lead to new treatments for some of these harder-to-treat diagnoses. “We think that by targeting epigenetic regulators we can not only treat cancer but also make them more susceptible to chemotherapy,” she says.



BARBARA STEFANSKA

Barbara Stefanska gave up her morning java ritual several years ago when medical reports hinted that it might not be good for our health. But thanks to her own research, she's waking up and smelling the coffee again.

Stefanska, an assistant professor of nutrition science and a member of a cancer prevention group initiated at Purdue this year, is focusing her research on epigenetic changes to our DNA that occur from environmental exposures. Unlike genetic mutations, which can only be reversed through gene therapy, epigenetic changes — which don't affect the underlying genetic code — can be reversed through simple changes like medications and diet.

A number of studies have suggested that bioactive compounds present in food and herbs can modulate gene expression. "My hypothesis is that these compounds can target epigenetic components in our DNA and in this way prevent disease," she says.

Other recent studies have linked the consumption of coffee — caffeinated or not — with a decrease in cancer rates. While those lower rates have been found in a number of cancers, a particularly important one is primary liver cancer.

"People with cirrhosis have a very high chance of developing liver cancer, but coffee consumption has been shown to reduce cirrhosis," Stefanska says. "And in this way it reduces the risk of primary liver cancer."

But what about coffee makes it so special? Stefanska suspects it could be polyphenols, compounds with antioxidant properties that are abundant in plant-based foods. She's investigating how the polyphenols chlorogenic and caffeic acids might delay cancer development and/or its progression by modifying the epigenome for the good.

Stefanska has found some confirmation that the phenolic acids help protect against cancer development. But the mechanisms aren't clear. "So we need more evidence," she says. If further research bears out, she hopes that polyphenols like phenolic acids can be manufactured into supplements that will be recommended by physicians for daily use.

"But I'm more interested in changing dietary habits," says Stefanska, who drinks a demitasse of espresso most mornings before heading into the lab. "I want to study the natural compounds without any modifications to show people how the compound in this food is beneficial and why they should increase their consumption of this food or include it in their dietary schedule."

NEWS AND EVENTS



Mike Pigott, director of community relations for Purdue University, listens as astronaut and Purdue alumnus Dr. David Wolf speaks at the Cancer Moonshot Summit.



Graham Cooks speaks at Purdue's Cancer Moonshot Summit in Armstrong Hall.



Cancer Research Day last October 2015.

CANCER MOONSHOT SUMMIT

The Purdue University Center for Cancer Research hosted a Cancer Moonshot Summit as part of a national event in the atrium of the Neil Armstrong Hall of Engineering on Purdue's campus in June. Astronaut and Purdue alumnus Dr. David Wolf spoke at the event, which included a program and reception.

In addition to Wolf, speakers included Timothy Ratliff, distinguished professor of comparative pathobiology and the Robert Wallace Miller Director of the Purdue University Center for Cancer Research; Graham Cooks, the Henry Bohn Hass Distinguished Professor of Chemistry; Debbie Knapp, the Dolores L. McCall Professor of Comparative Oncology; Ji-Xin Cheng, professor of biomedical engineering and chemistry; and Terry Kix, director of women's basketball operations and cancer survivor.

Cooks discussed his research into guided brain cancer surgery and the ongoing clinical trials. Knapp, a veterinary oncologist, discussed her bladder cancer research and the similarities between cancer in dogs and humans. Cheng discussed his pancreatic cancer and prostate cancer research, as well as the potential of spectroscopic imaging for early diagnosis of disease. Kix discussed her personal battle with cancer and how research saved her life.

The Cancer Moonshot Summit national event was aimed at creating action and fostering collaborations around the goals of the national Cancer Moonshot. It was the first time that stakeholders representing all types of cancers convened under one national charge. Attendees at summits across the nation included leaders representing the entire cancer community — researchers, doctors, scientists, philanthropists, community oncologists, advocates, patients and survivors, according to a statement from the Cancer Moonshot initiative.

"The Moonshot cannot be achieved by one person, one organization, one discipline, or even one collective approach," said Vice President Joe Biden in a statement. "Solving the complexities of cancer will require the formation of new alliances to defy the bounds of innovation and accelerate the prevention, diagnosis, treatment and — ultimately — a cure. It's going to require millions of Americans speaking up and contributing what they're able. That's what the Cancer Moonshot Summit is all about."

PURDUE CANCER RESEARCH DAY

The Purdue Cancer Research Day is the flagship collaborative research event of the Purdue University Center for Cancer Research, providing a forum for scientific exchange and the opportunity to explore shared scientific interests with a common goal of curing cancer. The event was held in fall 2015 at the Holiday Inn in historic downtown Lafayette.

Collaboration is a key component of Purdue research success, and cancer research is no different. More than 261 researchers representing 19 departments at Purdue were involved in several activities including poster sessions, networking platforms, a keynote presentation and discussions.

The diversity of expertise made this event unique in the region. Topics included drug design and medicinal chemistry, structural biology, and cancer prevention; all spectrums were covered to spur synergistic collaborations and get closer to finding cures. With 98 posters displayed for two hours, the energy in the room was abounding and everyone wanted to seize the opportunity to share and collaborate.

The world-class keynote speaker traveled from Princeton University eager to collaborate with Purdue scientists. This was a highly successful event. Many new projects emerge directly from interactions at this event, followed by numerous discussions that took place after. As a result, subsequent meetings with promising research results have occurred to conquer cancer.

DONOR UPDATE

The Purdue University Center for Cancer Research faculty and staff are grateful for our loyal donors and ambassadors. Private philanthropy is especially important because it often jump-starts projects that do not yet have the data needed to attract larger grants, therefore acting as the foundation of many discoveries. Once a project is off the ground and running, it may then be viable for more support that can, in turn, move the discovery to the clinic more quickly.

You are a partner in our mission and goal to discover a cure for cancer. You plan an important role as a benefactor and help to move research from scientific discovery to life-saving prevention, detection, and treatment. The Purdue University Center for Cancer Research is a leader in cancer research and your support is a key component of our success.

We were fortunate to share the hopeful news of the work of the center with many audiences this past year through events that were hosted by our donors.

- Don Dunaway, Director's Advisory Board member chairman, hosted a dinner in Naples, Fla. to introduce new friends to the center and encourage support of our research.
- Joy Matson, Director's Advisory Board member, renovated a house in West Lafayette, Ind., and hosted an open house to share information about the Center for Cancer Research. She then sold the home and donated all of the proceeds from the sale to the center.
- Marti Schmidt, Director's Advisory Board member, hosted a group

of friends in her home for a "Sleep in for The Challenge" brunch. Participants made a donation to the center. She also hosted an arts and crafts open house at her home in Illinois as a fundraiser for the center.

- Marcy Ziek, Director's Advisory Board member, hosted a dinner in Cincinnati, Ohio, to introduce new friends to the center and encourage support of our research.
- Purdue Women's Club 20|30 and McGraw's Steak Chop and Fish House hosted the Hammer Down Cancer luncheon.
- Brad Hansen, Purdue alumnus and friend of the center, hosted a "Wine Country Road Rally" in Indiana and donated the proceeds.

IN MEMORIAM

The Purdue Center for Cancer Research lost two close friends this year who are remembered for their service as past members of our Director's Advisory Board. They will be remembered for their generous spirit and great advocacy of cancer research at Purdue and beyond.

Vernon Richard Miller

Dick Miller was a Center for Cancer Research Director's Advisory Board member and alumnus of the College of Science. Dick and his wife, Jane, established an endowment in the name of their son, whom they lost to cancer. That endowment funds the Robert Wallace Miller Director position at the Center for Cancer Research. Dick was a loyal Purdue athletics fan and important ambassador for the Purdue Center for Cancer Research.



Mary Beth Gadus

Mary Beth fought a long and courageous 28 year-long battle with breast cancer. Mary Beth was a Center for Cancer Research Director's Advisory Board member and alumna of the College of Health and Human Sciences. She was an incredible ambassador for cancer research and defied all odds.



THE CHALLENGE

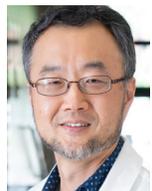


The Challenge 5K Run/Walk celebrated its ninth year in April. Honorary chair and past head football coach Darrell Hazell kicked off the race. Since it began in 2008, the Challenge has attracted around 1,800 participants each year and has raised more than \$604,000 total to support cancer research.

Each year, The Challenge proceeds benefit researchers working on innovative ideas that will generate high impacts in the field of cancer, thus making their research projects more attractive to larger or federally funded grants.

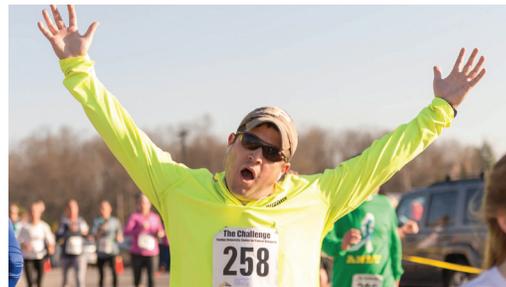
Two faculty members were awarded grants this year.

Vincent Jo Davisson, a professor of medicinal chemistry and molecular pharmacology, was honored for his project, "Synthetic lethal antagonist combinations targeting DNA repair protein interactions."



Chang Kim, a professor of comparative pathobiology, was honored for his project, "Impact of gut microbial metabolites on colon cancer development."

The Challenge 2017 will be held on April 8. Register at thepurduechallenge.com.





SPONSORS

- Arni's Restaurant
- Basham Rentals
- Dowell Automotive Repair Inc.
- Fleet Feet Sports, West Lafayette
- Franciscan St. Elizabeth Health
- IU Health Cancer Centers
- Maru Sushi
- Parkwest Fitness
- PUCCR Director's Advisory Board
- Purdue Alumni Association
- Purdue Federal Credit Union**
- Red Seven Bar & Grill
- Subaru of Indiana Automotive, Inc.

MEDIA SPONSORS

- B102.9 FM Radio
- ESPN Radio 1450
- Gold & Black Illustrated
- WASK (98.7) Radio
- WKHY (93.5) Radio
- WKOX (K105) Radio
- WLFI TV 18

OTHER SPONSORS

- Coca-Cola
- Copymat
- Dildine Designs
- Einstein Bros. Bagels
- Follett
- Fresh City Market
- Levy Restaurants
- Pay Less Super Markets
- Puccini's Smiling Teeth
- Purdue Athletics
- Purdue Musical Organizations
- Tri-N-Run

LEADERSHIP

Center for Cancer Research Administration

Timothy Ratliff, Robert Wallace Miller Director
Andrew Mesecar, Deputy Director
Douglas Cuttell, Managing Director
Tim Bobillo, Director of Development
Julie Hendon, Manager of Donor Relations
Kim Crist, Development Assistant
Michelle Liratni, Receptionist/Assistant to the Director
Janet Kliewer, Business Manager
Rita Robertson, Business Clerk
Kristie Dowell, Building Deputy

Interdisciplinary Research Groups

Cell Identity and Signaling

Xiaoqi Liu, Program Leader
Chang-Deng Hu, Program Co-Leader

Chemical and Structural Biology

Cynthia Stauffacher, Program Leader
David Thompson, Program Co-Leader

Medicinal Chemistry

Zhong-Yin Zhang, Program Leader
Deborah Knapp, Program Co-Leader

Drug Delivery and Molecular Sensing

Alexander Wei, Program Leader
Bumsoo Han, Program Co-Leader

Director's Advisory Board

Beth Bangs, West Lafayette, IN
Terry Bowen, Indianapolis, IN
Donald Dunaway, Naples, FL
Mary Beth Gadus †, Indianapolis, IN
Todd Gilman, Manhattan Beach, CA
Donna Heckler, Saint Louis, MO
Jennie Jones, West Lafayette, IN
Joy Matson, Rossville, IN
Rick Miller, Plymouth, IN
Martha (Marti) Schmidt, Naperville, IL
Don Schoeff, Huntington, IN
Marcy Ziek, Cincinnati, OH

Ambassador

Linda Rohrman, Lafayette, IN

Drug Evaluation Committee

Dr. John Landis, Carmel, IN
Dr. Gunda Georg, Professor and Head, Medicinal Chemistry, College of Pharmacy, University of Minnesota
Dr. James S. MacDonald, President, Chrysalis Pharma Partners, LLC
Dr. Philip Hipskind, Senior Research Fellow, Eli Lilly
Dr. Homer Pearce, Zionsville, IN
Dr. Ivan Horak, Chief Scientific and Medical Officer, Symphogen A/S
Dr. Catherine Strader, Artemis Partners, LLC

External Advisory Committee members

Cell Identity and Signaling

Janet Houghton, Lerner Research Institute/Cleveland Clinic
Robert Lewis, Eppley Institute for Research in Cancer and Allied Diseases, University of Nebraska Medical Center
Dr. H. Kim Lyerly, Duke University School of Medicine
Michael Ostrowski, Ohio State University
Lisa Sideras, Administration, Wistar Institute

Chemical and Structural Biology

Mark Walter, University of Alabama – Birmingham
Peter Wipf, University of Pittsburgh
Nikola Pavletich, Memorial Sloan Kettering Cancer Center

Drug Delivery and Molecular Sensing

Jinming Gao, Simmons Comprehensive Cancer Center/UT Southwestern Medical Center at Dallas
Vladimir P. Torchilin, Northeastern University

Medicinal Chemistry

Dr. Kit Lam, University of California Davis Cancer Center
Dr. Edison T. Liu, The Jackson Laboratory
Susan Mooberry, UT Health Science Center San Antonio

Liaison Committee

Suresh Garimella, Executive Vice President for Research and Partnerships
Jay Akridge, Dean, College of Agriculture
Venkataramanan Ragu Balakrishnan, Head, School of Electrical and Computer Engineering
J. Catherine Scott-Moncrieff, Head, Department of Veterinary Clinical Sciences
Melba Crawford, Associate Dean for Research, College of Engineering
Harm Hogenesch, Associate Dean for Research, College of Veterinary Medicine
Laurie Jaeger, Head, Department of Basic Medical Sciences
Perry Kirkham, Project Coordinator, Office of the Executive Vice President for Research and Partnerships
Richard Kuhn, Head, Department of Biological Sciences
Christine Ladisch, Dean, College of Health and Human Sciences
Andrew Mesecar, Head, Department of Biochemistry
Karen Plaut, Senior Associate Dean for Research and Faculty Affairs, College of Agriculture
Willie Reed, Dean, College of Veterinary Medicine
Jeffrey Roberts, Dean of Science - Physical Chemistry
Craig Svensson, Dean, College of Pharmacy
Ramesh Vemulapalli, Head, Department of Comparative Pathobiology
Connie Weaver, Head, Department of Nutrition Science
George Wodicka, Head, Weldon School of Biomedical Engineering
Zhong-Yin Zhang, Head, Department of Medicinal Chemistry and Molecular Pharmacology
Wei Zheng, Head, School of Health Sciences
Timothy Zwier, Head, Department of Chemistry

† *In memoriam.*

PURDUE UNIVERSITY CENTER FOR CANCER RESEARCH

Hansen Life Sciences Research Building, Room 141

201 S. University Street

West Lafayette, Indiana 47907-2064

765-494-9129; Fax: 765-494-9193

cancerresearch@purdue.edu

EA/EOU