

# 2018

SCIENTIFIC REPORT



INDIANA UNIVERSITY  
**MELVIN AND BREN SIMON  
CANCER CENTER**



## MISSION

To create an expanding  
community of  
researchers and  
health professionals  
who conduct outstanding  
translational research,  
provide excellence  
in education and deliver  
high quality  
patient-centered care.

## From the director



Patrick J. Loehrer Sr., MD

The past year was unusually busy because my administrative team and I—and a cast of countless others—devoted considerable time to preparing for renewal of our National Cancer Institute (NCI) designation. In reality, we devoted 18 months or more to get ready, which included submitting a 1,550-page grant application to the NCI.

An intensive, all-day visit from reviewers from other NCI-designated cancer centers, as well as the NCI, was held in February 2019. The reviewers evaluated our four research programs, shared facilities, institutional support and our impact to ensure that we meet the NCI's rigorous criteria.

Our NCI designation puts us in an elite group of only 70 cancer centers across the nation that focus on the rapid translation of research discoveries to benefit people with cancer. I look forward to sharing with you in this space next year results of our site visit.

Among the highlights of 2018 was the celebration of a milestone: The hematology/oncology fellowship program at IU School

of Medicine marked its 40th anniversary, making it one of the oldest training programs in the country.

Nearly 100 of our former fellows returned to Indianapolis to honor their mentors and mingle with colleagues and friends at a memorable reunion. They also created an endowment for future fellows. The fellows have gone on to become physicians at the nation's best hospitals and cancer centers, leading scientists who have contributed to cancer research and influential leaders in national cancer organizations and associations. They have made an impact in their communities and beyond.

*Other highlights from the past year included:*

**Hal Broxmeyer, PhD**, has been conducting groundbreaking research into lifesaving umbilical cord blood transplantation for decades. His work earned him the prestigious National Heart, Lung, and Blood Institute Outstanding Investigator Award, a \$5.4 million grant that will enable him to continue his important research for years to come.

**Ken Nephew, PhD**, and **Kathy Miller, MD**, were among those named to the Van Andel Research Institute—Stand Up To Cancer

(VARI-SU2C) Epigenetics Dream Team, a multi-institutional effort to identify new and more effective cancer therapies. The two are working to develop a new therapy and identifying new targets for metastatic triple negative breast cancer.

**Sophie Paczesny, MD, PhD**, received funding from the Cancer Moonshot, an accelerated plan conceived by former Vice President Joe Biden to end cancer. Her \$4.1 million grant from the NCI will advance immunotherapies for children and adolescents, especially those with leukemia.

**Theresa Guise, MD**, earned a \$1.2 million Department of Defense grant to explore a cascade of events that decreases quality of life and treatment responses for patients with metastatic bone cancer. She hopes to understand the role of the tumor-bone microenvironment on glucose metabolism and the role that a high-fat diet plays in the process.

I could go on, but I am limited by space. Please turn the pages to discover more stories about how our researchers are impacting Hoosiers and others with cancer.

A handwritten signature in dark ink, appearing to read 'Pat'.

Patrick J. Loehrer Sr., MD

IU Distinguished Professor; Associate Dean for Cancer Research; Director, Indiana University Melvin and Bren Simon Cancer Center;  
H.H. Gregg Professor of Oncology; Professor of Medicine, *Indiana University School of Medicine*





# Popular arcade game is inspiring a new treatment for an aggressive type of breast cancer

by KAREN SPATARO

Think back to your days as a kid. Ever stop by an arcade?

If you did, you almost certainly played Whac-A-Mole, the popular game in which toy rodents randomly pop up from holes, and you desperately try to thump them back into hiding with a mallet.

For most of us, Whac-A-Mole was a fun way to pass time and maybe win some cheap arcade prizes.

For **Milan Radovich, PhD**, and his team, it may be the answer to helping more individuals overcome triple negative breast cancer—a particularly aggressive form of the disease that disproportionately affects young women and African American women.

Triple negative breast cancer is smart. Researchers will detect a potential genetic culprit they believe is helping the cancer grow. But when they knock it down with a drug, another misfit pops up, allowing the cancer to continue thriving.

It's just like the game, thought Radovich. But what if we could knock out the first "mole," and predict which one would pop up next, he wondered. And what if we could block that hole, too? Would that be enough to short-circuit the game? Or, in his case, would that enable him to outsmart triple negative breast cancer and give cancer-fighting drugs a chance to do their job? His lab is about to find out.

Radovich and his laboratory team spent years analyzing triple negative breast cancer tumors and comparing them to healthy, non-cancerous breast tissue. Their goal was to identify precisely what had gone haywire in the cells so they could pick the best drug to attack the cancer.



*Drs. Radovich and Miller along with Jeffrey Solzak and Brad Hancock developed and are testing a new approach to treating triple negative breast cancer.*

Then, they looked at how the tumors respond and adapt after being hit with that initial therapy. And they identified a second drug to circumvent this real-time adaptation. In other words, they wanted to block the next hole before the mole could pop out again. After promising pre-clinical results spearheaded by Jeff Solzak, MS, MBA, lab director, the "Whac-A-Mole" theory has now moved into a first-in-human clinical trial run by **Kathy Miller, MD**. As part of the trial, patients at the IU Health Simon Cancer Center are the first in the world to receive a unique two-drug combination. This study is an important first step to test whether the drug combination is safe.

Currently, there are no targeted therapies for triple negative breast cancer that work for the majority of women with the disease. Personalized therapies go after a cancer's unique vulnerabilities, and the absence of a customized treatment is one reason why it is so devastating.

There is a huge need for better and more targeted therapies in triple negative breast cancer," said Radovich, assistant professor of surgery at IU School of Medicine.

"This disease disproportionately affects young women and African American women, and it kills far too many individuals every year. I am motivated every day to develop better therapies for this disease and to benefit our patients in Indiana and across the country."

Radovich remains hopeful that this trial will ultimately result in meaningful improvements in care. If it does, we can all thank a favorite arcade game for giving him some inspiration.

*At left: IU Simon Cancer Center member Milan Radovich is working to make advancements against triple negative breast cancer.*

Get the fast facts on page 16.







# Hudmon leads national tobacco cessation education program

by MICHAEL SCHUG

In 2018, Indiana fell three spots in two different categories in “America’s Health Rankings.” Overall, the state dropped to 41st, placing us near the bottom among the 50 states in terms of drug deaths, excessive drinking, obesity, physical inactivity, smoking and other measurements. The downward trend is impacted by the number of Hoosiers who smoke. In fact, 6 percent more Hoosiers indicate they are smoking compared to just two years ago. According to the annual state-by-state guide, that prevalence now ranks the state at 44th.

Not surprisingly, lung cancer is the leading cause of cancer mortality in Indiana, which motivates people such as cancer center member **Karen Hudmon, DrPH**, to work tirelessly to change that. Driven by her mother’s death at age 50 from lung cancer, Hudmon has played a key role in a national program that aims to better equip clinicians to help their patients quit using tobacco.

She has led a team that developed Rx for Change: Clinician-Assisted Tobacco Cessation, a training program that teaches clinicians and students of all health professional disciplines – including pharmacy, medicine and nursing – not only how to help people quit smoking but to cease using all tobacco products. The program has become the most widely used tobacco cessation curriculum for training health care professionals in the nation.

That’s quite an accomplishment and one for which Hudmon and a colleague earned

an award from the U.S. Public Health Service for their exceptional contributions and national impact on tobacco cessation education. More recently, Hudmon led a study and discovered that pharmacists and their staffs play an instrumental role in referring people to the tobacco quitline, 1.800.QUIT.NOW.



For the study, Hudmon evaluated the impact of two interventions on the number of pharmacy-based referrals to the tobacco quitline: On-site training for pharmacists and pharmacy technicians vs. mailed materials to pharmacies. Regardless of the intervention, pharmacy staff were more than willing to talk with people about their tobacco use and refer them to the quitline. And that brief encounter increased the number of quitline callers who reported hearing about it at a pharmacy by nearly twofold.

“These results were exciting because it was the first study to demonstrate that the pharmacy profession can make a measurable difference in the number of people who call the tobacco quitline for assistance,” Hudmon said.

How did the interaction work? “Pharmacy staff routinely asked patients about their tobacco use and advised tobacco users to quit,” Hudmon explained. “If they were ready to quit, the pharmacist provided counseling and/or referred them to the tobacco quitline.” And that’s an important step in helping people to stop smoking and using tobacco products, which improves their overall health and decreases their chances of developing cancer.

“I encourage individuals who smoke to consider their pharmacist as a resource when they are planning to quit,” Hudmon said. “Pharmacists can make recommendations and describe the proper use of cessation medications, which will make tobacco users more comfortable while quitting. They also can connect patients with the quitline for additional assistance. When medications are combined with help from the quitline, chances of quitting successfully are greatly increased.”

*At left: Nationally recognized for her work in tobacco cessation education, Karen Hudmon is professor of pharmacy practice at Purdue University College of Pharmacy and an adjunct clinical assistant professor at IU School of Medicine.*

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# Pancreatic cancer researcher heads IU's role in national consortium

by MARY HARDIN

**Evan Fogel, MD**, whose clinical and research interests focus on the pancreas, leads IU's association with the National Institutes of Health-sponsored Consortium for the Study of Chronic Pancreatitis, Diabetes and Pancreatic Cancer (CPDPC). IU is one of only 10 members selected to study how to improve the diagnosis and treatment of chronic pancreatitis and its complications, including pancreatic cancer. The goal is to save lives by developing tools for early detection.

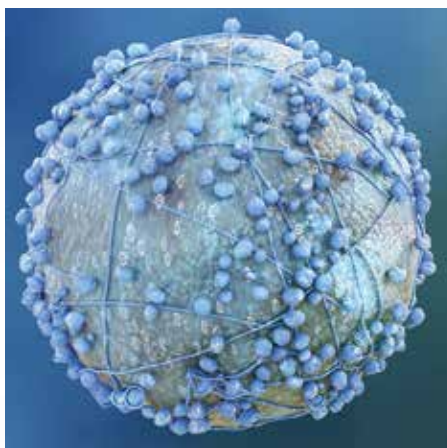
The consortium offers unprecedented opportunity for leading researchers to focus on an organ that plays a key role in digestion of food, neutralization of stomach acid and glucose control. The pancreas produces insulin and secretes enzymes and other hormones that help break down food. A poorly functioning pancreas can cause everything from digestion issues, disabling pain, diabetes and cancer. Treatment options for some conditions that affect the pancreas are limited in part because the standard available tests may not readily identify disease.

People with pancreatitis have a tenfold greater risk of developing pancreatic cancer, which is the third leading cause of cancer death. Only 8.5 percent of these patients survive five years.

"Chronic pancreatitis is a very difficult disease to manage," Fogel said. "We need ways to diagnosis it early, before the fibrosis or scarring progresses, potentially

leading to complications including diabetes, osteoporosis or pancreatic cancer. The tools currently used for diagnosis are often inadequate so that is one of the challenges the NIH has presented: Find a way to make this diagnosis earlier."

The consortium has been tasked with identifying biomarkers that forecast if or when pancreatitis will advance to chronic disease, diabetes or cancer.



Dozens of pancreas research studies are underway but the four primary ones funded by the consortium sponsors are multicenter studies, each identified by an encouraging acronym: PROCEED, INSPPIRE-2, NoD and DETECT. Combined the studies will enroll thousands of patients and follow some of them for two decades.

PROCEED will monitor patients with suspected or definite chronic pancreatitis. Study participants will regularly provide

biological samples for testing and banking. By noting the changes in chemistry of the samples, researchers hope to see a pattern that, over time, will identify biomarkers that signal disease progression or development of complications.

INSPPIRE-2 is a pediatric study, while NoD is focused on patients over the age of 50 with new onset diabetes, which may signal the presence of pancreatic cancer.

DETECT looks at patients with Type 2 diabetes as well as a form of diabetes related to other pancreatic disease. Diabetes associated with pancreatic cancer will also be studied and metabolic studies will be evaluated to determine why some patients develop diabetes and others do not.

"This research effort is overdue," Fogel said. "Chronic pancreatitis may not be discussed as much as other illnesses, but the suffering it causes and the effect it has on quality of life and longevity is very real. I'm excited that IU is one of the leading research institutions tackling this challenge."

*At left: IU Simon Cancer Center member Evan Fogel is part of the IU team that leads the nation in volume of both endoscopic pancreatic procedures and pancreatic surgeries performed.*

Get the fast facts  
on page 16.





# Tyler Trent's tumor samples help cancer researchers

by ANDREA ZEEK and MICHAEL SCHUG

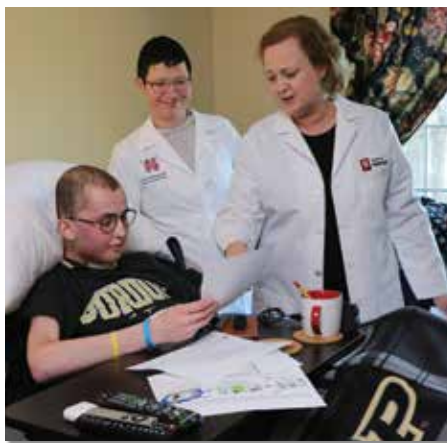
When Purdue University student Tyler Trent found out in May 2017 that his osteosarcoma had spread, he decided to help the IU School of Medicine and IU Simon Cancer Center physician-scientists who treated him learn more about the aggressive bone cancer, which currently has no cure.

Trent, who died Jan. 1, 2019, at age 20, was first diagnosed with osteosarcoma at age 15, when the cancer was found in his shoulder area. A few years later, when the cancer returned, he agreed to provide tissue samples from a tumor removed from his pelvis in hopes of prolonging other kids' lives and to motivate others to become advocates for research.

Trent knew his likely fate, but still in December 2018 he said, "Without the research that's been done, I wouldn't be here or be able to speak to you. Because of the genomic testing that was done on my tumor, those drugs (were included and they) basically prolonged my life."

Cancer center members **Karen Pollok, PhD**, and **Jamie Renbarger, MD**, were among those who helped obtain DNA sequencing of Trent's tumor to advance the understanding of what was causing it to grow. This information led the team to select four medications as part of Trent's personalized treatment plan, including traditional chemotherapy in combination with novel, small molecule targeted inhibitors.

Pollok pointed out this was a unique situation because samples are never identified with a patient. However, because of Trent's curiosity and questions about his tumors, clinicians and researchers worked together to identify his samples with his permission. Pollok and colleagues made cancer cell lines with Trent's samples by putting them in immuno-deficient mice, which allows researchers to remove, freeze or store them and study their molecular characterization—all of which helps them predict what will happen clinically.



*Drs. Renbarger (left) and Pollok meet with Tyler Trent in late 2018 to share information on how his donation is helping research.*

"The beauty of the PDX (patient-derived xenograft) such as Tyler's is you can measure the tumor's response to drugs in a mouse," Pollok said. "But just as importantly, you can measure how it affects the normal tissues in the body. You cannot do that with a sample in a petri dish."

Trent's samples are needed, Renbarger said, because one of the challenges that pediatric cancer researchers face is a lack of tumor models—particularly for relapsed solid tumors, which would provide them the opportunity to study cancers that come back. "One of the really amazing things and very unique things about the samples and models we were able to collect and develop from Tyler is that we not only have a sample from the time of his relapse prior to relapse chemotherapy, but also from the period after he got chemotherapy," Renbarger said. "So we can understand what we call the tumor adaptive response—how it changes after exposure to chemotherapy—and also have both of those models to study in the laboratory."

The IU team intends to submit Trent's PDX samples to the National Cancer Institute Patient-Derived Models Repository so that other researchers will have access to them. The tumor models will ensure his memory lives on through the research he so bravely supported.

*At left: Karen E. Pollok focuses on refining combination targeted therapy and development of new multi-phase treatment strategies.*

*Get the fast facts on page 16.*







# Cancer center docs provide Indiana's first CAR T-cell therapy to patients

BY MICHAEL SCHUG

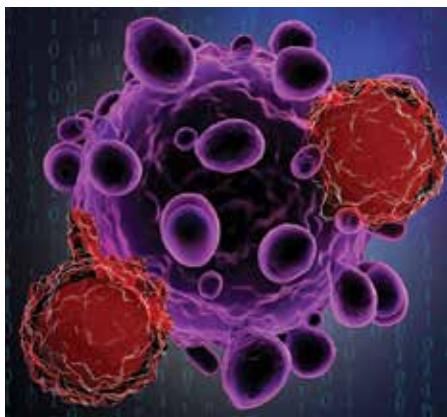
In recent years, immunotherapy has been a buzzword in cancer research and patient care, with chimeric antigen receptor (CAR) T-cell therapy stealing most of the headlines. It's hailed as a promising form of immunotherapy as many patients with certain types of difficult-to-treat leukemia and lymphoma experience astonishing results after other therapies have failed.

In 2018, five adult and two pediatric patients became the first people in Indiana to receive CAR T-cell therapy. And cancer center members **Sherif Farag, MD, PhD**, and **Jodi Skiles, MD, MS**, became the state's first doctors to offer the FDA-approved, one-time treatment to adult and pediatric patients.

"CAR T-cell therapy is a form of immune therapy for cancer," Farag explained. "It involves taking immune cells from the patient, engineering them in a way that they specifically target the cancer cells and infusing them back into the patient. The cells are then activated when they meet the cancer cells. It's a way of specifically getting the immune system to kill the cancer cells because normally the cancer turns off the immune system in a way that these cells don't recognize the cancer cells."

Skiles, a pediatrician, tells her young patients that those re-engineered cells are "ninja cells." "Those ninja cells are designed to seek out and destroy cancer cells," she explained. Farag and Skiles, like many in the

medical community, consider CAR T-cell therapy to be the future of cancer treatment.



"I think it is groundbreaking," Farag said. "We've seen major impact against the disease as opposed to a small, incremental impact. I think it is curing a proportion of patients. The future will be to see how we can make it more effective for all patients, understand why some patients are resistant to it and see if we can expand it to other types of cancers."

Skiles agreed. "I think it is genuinely a groundbreaking therapy, especially considering that it is being used in patients who would likely otherwise die of their disease," she said.

However, she pointed out that some patients can't wait for the therapy. "The biggest limitation is the month-long delay from collection of cells to infusion

of cells, which many patients cannot tolerate. Having that kind of delay makes it prohibitive for some patients to get this therapy because they just can't wait that long for treatment," she said.

Both physician scientists are working on designing clinical trials that would introduce CAR T-cell therapy earlier in the course of treatment instead of offering it only after the disease has failed multiple other lines of therapy. It is possible that by administering it earlier in treatment, the therapy may be even more effective with less toxicity.

Looking to the future, both predict immunotherapy will be offered for many other types of cancers.

They agree that if CAR T-cell therapy can be engineered to recognize a specific protein common in some forms of leukemia and lymphoma, then theoretically, it should be possible to engineer it to recognize and attack other cancer targets.

*At left: Jodi Skiles and Sherif Farag are the first physicians to provide CAR T-cell therapy to patients in Indiana.*

*Get the fast facts on page 16.*





## Research programs



The IU Simon Cancer Center is Indiana's only National Cancer Institute (NCI)-designated cancer center that provides patient care, and is one of only 70 in the nation. The NCI-designated Cancer Centers Program recognizes that our research programs meet rigorous criteria for world-class, state-of-the-art programs in multidisciplinary cancer research. The goals of our programs range from understanding the molecular changes that cause cancer to developing targeted therapies to prevent and treat cancer.





## Cancer Prevention and Control (CPC) research program

The long-term goal of the Cancer Prevention and Control research program is to reduce the incidence, morbidity and mortality of cancer for the citizens of Indiana and beyond.



### Susan Rawl, PhD

Professor of Adult Health  
IU School of Nursing

### Todd Skaar, PhD

Professor of Medicine  
IU School of Medicine

## Members

### Mohammad Abu-Zaid, MD\*

Tarah Ballinger, MD  
Eric Benson, MD, PhD  
Darron Brown, MD  
Lisa Carter-Harris, PhD  
Clinton Cary, MD, MPH  
Victoria Champion, PhD, RN

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### Scott Coven, DO, MPH\*

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Sheri Robb, PhD

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Bryan Schneider, PhD  
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**Susan Storey, PhD\***  
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Lois Travis, MD, ScD  
Terry Vik, MD  
Fletcher White, PhD  
Kara Wools-Kaloustian, MD  
Jianjun Zhang, MD, PhD  
Gregory Zimet, PhD  
**\*accepted in 2018**

## Experimental and Developmental Therapeutics (EDT) research program

The mission of the Experimental and Developmental Therapeutics research program is to promote, develop and exploit mechanism-based research for improved cancer therapy.



### David Boothman, PhD

Sidney and Lois Eskenazi Professor of Hematology-Oncology Professor  
IU School of Medicine  
Associate Director of Translational Research, IU Simon Cancer Center

### Roberto Pili, MD

Robert Wallace Miller Professor of Oncology, Professor of Medicine, Professor of Urology  
IU School of Medicine  
Co-leader, Indiana Genitourinary Cancers Research Consortium  
IU Simon Cancer Center

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Hiromi Tanaka, PhD  
John Turchi, PhD  
Gabriel Zentner, PhD  
Jian-Ting Zhang, PhD  
Xinna Zhang, PhD  
**\*accepted in 2018**

## Hematopoiesis and Hematologic Malignancies (HHM) research program

The goal of the Hematopoiesis and Hematologic Malignancies research program is to enhance treatment of hematologic malignancies, with a focus on leukemia, pre-leukemia and multiple myeloma.



### G. David Roodman, MD, PhD

Director, Division of Hematology/Oncology, Kenneth Wiseman Professor of Medicine  
Professor of Biochemistry & Molecular Biology  
IU School of Medicine

### Hal E. Broxmeyer, PhD

IU Distinguished Professor, Mary Margaret Walther Professor Emeritus  
Professor of Microbiology/Immunology  
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Sophie Paczesny, MD, PhD

Louis Pelus, PhD  
Naoyuki Saito, MD, PhD  
Edward Srour, PhD  
Attaya Suvannasankha, MD  
Kai Yang, PhD  
Ji Zhang, PhD  
**\*accepted in 2018**

## Tumor Microenvironment and Metastasis (TMM) research program

The Tumor Microenvironment and Metastasis research program studies the tumor microenvironment and its effect to dysregulate bone and muscle strength as well as metabolism.



### Theresa Guise, MD

Jerry and Peggy Throgmartin Professor of Oncology  
Professor of Medicine  
IU School of Medicine

### Kenneth Nephew, PhD

Professor of Cellular and Integrative Physiology  
IU School of Medicine

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Kenneth White, PhD  
Jingwu Xie, PhD  
Cong Yan, PhD  
Hiroki Yokota, PhD  
Teresa Zimmers, PhD  
**\*accepted in 2018**

# Shared facilities

The IU Simon Cancer Center provides its members (researchers) with access to cutting-edge equipment, technology and services with 16 shared facilities. Each facility, staffed by experts, helps members make advances in cancer research.

## **Angio BioCore**

Karen Pollok, Director  
Emily Sims, Manager  
[cancer.iu.edu/angiobiocore](http://cancer.iu.edu/angiobiocore)

## **Behavioral Methodology and Recruitment Core**

Stephanie Wofford, Manager  
[cancer.iu.edu/behavioral](http://cancer.iu.edu/behavioral)

## **Biostatistics and Data Management**

Hao Liu, Director  
[cancer.iu.edu/biostats](http://cancer.iu.edu/biostats)

## **Cancer Bioinformatics**

Jun Wan, Director  
[cancer.iu.edu/bioinformatics](http://cancer.iu.edu/bioinformatics)

## **Clinical Pharmacology Analytical Core**

Jamie Renbarger, Scientific Director  
Zeruesenay Desta, Scientific Director  
[cancer.iu.edu/cpac](http://cancer.iu.edu/cpac)

## **Clinical Trials Office**

Mario Contreras, Administrator  
Kathy Miller, Medical Director  
[cancer.iu.edu/cto](http://cancer.iu.edu/cto)

## **Epidemiology Consultation Core**

Hongmei Nan, Director  
[cancer.iu.edu/epi](http://cancer.iu.edu/epi)

## **Flow Cytometry**

Edward Srour, Director  
[cancer.iu.edu/flow](http://cancer.iu.edu/flow)

## **Genomics Core**

Yunlong Liu, Director  
[cancer.iu.edu/genomics](http://cancer.iu.edu/genomics)

## **In Vivo Therapeutics**

Karen Pollok, Director  
Tony Sinn, Manager  
[cancer.iu.edu/ivt](http://cancer.iu.edu/ivt)

## **Multiplex Analysis Core**

Christie Orschell, Director  
[cancer.iu.edu/mac](http://cancer.iu.edu/mac)

## **Proteomics Core**

Amber Mosley, Director  
[cancer.iu.edu/proteomics](http://cancer.iu.edu/proteomics)

## **Susan G. Komen Tissue Bank at the IU Simon Cancer Center**

Anna Maria Storniolo, Executive Director  
Jill Henry, Chief Operating Officer  
[komentissuebank.iu.edu](http://komentissuebank.iu.edu)

## **Tissue Procurement and Distribution**

Oscar Cummings, Director  
Mary Cox, Operations Manager  
[cancer.iu.edu/tissue](http://cancer.iu.edu/tissue)

## **Transgenic and Knock-Out Mouse**

Loren Field, Director  
Hanying Chen, Core Manager  
[cancer.iu.edu/mouse](http://cancer.iu.edu/mouse)

## **Translational Research Core**

David Boothman, Scientific Director  
Kristen Ross, Core Director  
[cancer.iu.edu/translational](http://cancer.iu.edu/translational)

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Mark Simons (page 4) | Purdue University  
Andrea Zeek (page 9) | IU School of Medicine

**On the cover:** A three-dimensional digital illustration of a cancer cell.

**Graphic designer:** Beebe Creative





## Popular arcade game ...

*From page 3*

The study got a significant boost when the National Cancer Institute awarded Radovich a two-year grant for more than \$375,000 in 2018.

The research received early funding from the Indiana Clinical and Translational Sciences Institute.

It also has been propelled by significant support from philanthropic donors, including the Catherine Peachey Fund, a program of the Heroes Foundation; individuals who give through 100 Voices of Hope, an innovative fundraising campaign that supports breast cancer research at IU; and several families affected by triple negative breast cancer.



## Hudmon leads ...

*From page 5*

Tobacco use is the leading risk factor for lung cancer. Smoking and second-hand smoke have both been shown to cause lung cancer.

The rate of new lung cancer cases in Indiana is 74.5, higher than the national rate of 63.0, and ranks 44th among all states.

The smoking rate in Indiana is 20.6 percent, higher than the national average of 16.8 percent.

Indiana's 2018 "State of Tobacco Control" report grades:

- "F" for tobacco prevention program funding
- "C" for smoke free air
- "F" for tobacco taxes
- "D" for access to tobacco cessation treatments
- "F" for tobacco 21 laws

*—American Lung Association*



## Pancreatic cancer ...

*From page 7*

Funded by the National Cancer Institute and the National Institute of Diabetes and Digestive and Kidney Diseases, the CPDPC includes IU and these other clinical research members:

- Baylor University
- Cedars-Sinai Medical Center
- Kaiser Foundation
- Mayo Clinic
- Ohio State University
- Stanford University
- University of Florida
- University of Iowa
- University of Pittsburgh

The University of Texas MD Anderson Cancer Center is the coordinating data management center/administrative site.



## Tyler Trent's tumor ...

*From page 9*

Osteosarcoma is among the diseases for which the IU Grand Challenge Precision Health Initiative is focused on improving treatments, finding cures and developing preventions.

The \$120 million initiative launched in June 2016 as the inaugural recipient of IU's Grand Challenges program with bold goals to cure one cancer and one childhood disease and to prevent one chronic illness and one neurodegenerative disease.

The initiative also aims to transform biomedical research and education at IU through the hiring of more than 35 new faculty, the growth of research facilities and cores and the creation of new training opportunities in precision health.

To learn more, visit [precisionhealth.iu.edu](https://precisionhealth.iu.edu).



## Cancer center docs ...

*From page 11*

CAR T-cell therapy has been made possible in Indiana through the IU Grand Challenge Precision Health Initiative.

Indiana University Health, the cancer center's clinical partner, is a certified treatment center for providing the therapy to both adult and pediatric patients.

The first adult patient to receive CAR T-cell therapy in the state was a lymphoma patient.

The first pediatric patient received CAR T-cell therapy to treat acute lymphoblastic leukemia (ALL).

To learn more, visit [precisionhealth.iu.edu](https://precisionhealth.iu.edu).

## Executive committee



**Front:** Richard Zellars, MD, associate director of clinical affairs; Patrick Loehrer, Sr., MD, director; and Kathy Miller, MD, associate director of clinical research. **Back:** Michael Darling, MHA, associate director of administration; Victoria Champion, PhD, RN, associate director of population science research; Harikrishna Nakshatri, BVSC, PhD, associate director of education; David Boothman, PhD, associate director of translational research; and Mark Kelley, PhD, associate director of basic science research.





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CANCER CENTER**

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