2017 SCIENTIFIC REPORT

INDIANA UNIVERSITY
MELVIN AND BREN SIMON CANCER CENTER

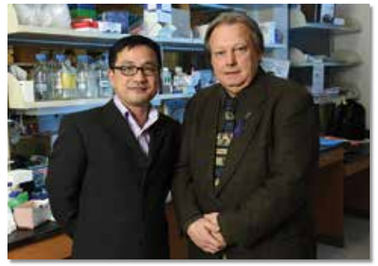
Hoosiers don't fare well on any of the national health rankings.

We tend to be overweight, and we smoke cigarettes—two factors that contribute to cancer. According to the 2017 "America's Health Rankings," Indiana's overall rank is 38th among the 50 states. When it comes to smoking, Hoosiers ranked even closer to the bottom at 41st, with more than 21 percent of the population lighting up.

Smoking is the leading cause of preventable death and is responsible for 30 percent of cancer deaths. Lung cancer is the leading cause of cancer mortality in Indiana, so it is welcome news that the IU Simon Cancer Center was one of only 22 centers to be selected in 2017 for the National Cancer Institute's Cancer Center Cessation Initiative, part of the NCI Cancer Moonshot program. The initiative's goal is to help cancer centers build and implement sustainable tobacco cessation treatment programs that will help their patients who are smokers to stop using tobacco.

cancer.gov

Our initiative is led by **Karen Hudmon, DrPH,** a pharmacist and tobacco researcher, and **Lisa Carter-Harris, PhD,** a nurse practitioner and tobacco behavioral scientist, in collaboration with **DuyKhanh Pham Ceppa, MD,** a thoracic oncology surgeon, and Debi Hudson, a respiratory therapist and tobacco treatment specialist. They and their colleagues will develop a strong, evidence-based program in the inpatient and outpatient settings at IU Health, our clinical partner, that will improve our patients' response to treatment, decrease the incidence of recurrence and reduce the overall tobacco-related disease burden among Hoosiers.

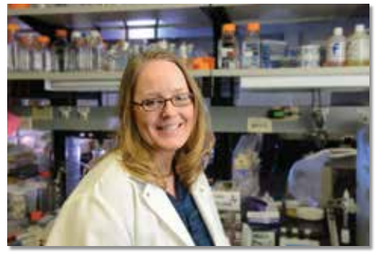


Xiongbin Lu, PhD, left, and David Boothman, PhD

The work of our two most recent recruits will surely benefit patients as well. **David Boothman, PhD,** and **Xiongbin Lu, PhD,** are principal investigators of four National Institutes of Health-funded projects.

Dr. Boothman is the inaugural Sid and Lois Eskenazi Professor of Hematology-Oncology, which was established to further enhance our research capabilities in lung cancer. He is an internationally respected investigator who has focused on the mechanisms and exploitation of cell stress responses in cancer versus normal cells and in developing biomarkers to expedite diagnosis and further treatment. These are important issues for many cancers, especially lung. Dr. Boothman is the new associate director of translational research and co-leader for experimental and developmental therapeutics at the cancer center. Dr. Lu is the Vera Bradley Foundation Professor of Breast Cancer Innovation. He is an outstanding investigator who focuses on cancer genomics and targeted therapies. He searches for genetic flaws in and around breast tumors that can be exploited for new ways to treat the disease.

In our mission statement, we underscore our commitment to making a difference in cancer in Indiana and beyond. In this report, you will see many examples of our impact. An example worth mentioning here comes from **Melissa Kacena, PhD.** Her project happened 250 miles above the Earth's surface aboard the International Space Station, where the weightlessness of space provided her the opportunity to study novel and current bone healing therapies on mice. In early 2017, a rocket launched carrying 40 mice from her lab to test a form of bone-healing therapy with the potential to help people with traumatic bone injuries. The mission's connection to cancer research involves the current FDA approved bone-healing agent that has been shown to increase the risk of developing cancer. "We think our agent is effective and safer than the current FDA approved agent," she said.



Melissa Kacena, PhD

The past year was marked with many accomplishments—too numerous to mention in this space. I am grateful to work alongside nearly 200 researchers at the IU Simon Cancer Center who are dedicated every day to make advances against cancer for Hoosiers and others. All of us are deeply indebted to our patients and the many donors who inspire us and support our joint efforts to make a difference.

Patrick J. Loehrer Sr., MD

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

Dr. Storniolo (front row, far right) with the Komen Tissue Bank staff.

A DECADE OF DISCOVERY:

Unique healthy breast tissue bank marks 10 years

By Michael Schug

Natascia Marino, PhD

While a post-doctoral fellow at the National Cancer Institute, **Natascia Marino, PhD,** found herself on a call in 2013 with her supervisor and a physician at the IU Simon Cancer Center. They were talking about the healthy breast tissue bank, the Komen Tissue Bank, housed at the cancer center. It is the only such bank of its kind.

"I couldn't believe the work they (tissue bank staff) were doing," Dr. Marino recalled while thinking about that conversation. "At first, I was impressed by the number of specimens. I thought that they consisted of tissues derived from prophylactic mastectomy. Then, when I looked at the tissue bank's website, I understood the bank included breast tissue biopsies voluntarily donated by healthy individuals. I remember reading that page twice."

To get an up-close look, Dr. Marino traveled to Indianapolis in 2014 to visit the Komen Tissue Bank and by November of that year she was volunteering at a breast tissue collection event—an event that had been repeated time after time since the bank was established in 2007. At each collection, typically 200 women representing all ages and different races willingly give a precious piece of themselves to help researchers make inroads against the disease.

Dr. Marino not only volunteered, but she soon joined the tissue bank staff, working alongside the bank's executive director, **Anna Maria Storniolo, MD.**

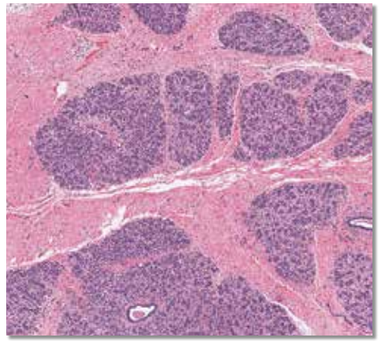
A Stanford-trained medical oncologist, Dr. Storniolo makes it easy to understand why these unique donations are so incredibly important. "To understand abnormal, you have to understand normal," she has said countless times.

Prior to the tissue bank, "normal" breast samples were considered those that were taken from either reduction mammoplasty (breast reduction) or tissue that had been taken from adjacent cancerous tissue. However, using breast tissue samples from the bank, researchers have shown that those samples are neither histologically nor molecularly normal. Thus, the bank's invaluable resources provide researchers around the world with samples that are as near normal as possible, helping them to discover more clues about the disease.

One particular preliminary clue stands out. **Hari Nakshatri, BVSc, PhD,** and colleagues have identified a unique population of breast cells that are enriched in the normal breast of African American women. Based on the biology of these cells, the researchers are investigating whether cancers originating from such cells are more aggressive. They are pursuing additional studies into this.

What is the significance of that?

"Normal breasts from African Americans are different from Caucasian and Hispanic women," Dr. Storniolo said. "That might seem obvious, but it really wasn't understood. When you think of the implications of that, you really have to start thinking about preventive approaches. One size isn't going to fit all."



Healthy breast tissue as seen from a microscope.

Currently the same drugs are used to reduce breast cancer risk in all women, Dr. Storniolo pointed out. But if women of different races have different breasts, then risk reduction will need to be tailored accordingly.

"This is about altering molecular signals, and we're learning that women of different races are wired differently," she said. "If you think about the best way to prevent, you alter the molecular signaling so the cells never alter in the first place."

Thanks to the selfless act of thousands of women who have donated healthy breast tissue and dedicated researchers such as Drs. Storniolo and Marino and their colleagues, more has been learned about the differences between normal and cancerous tissue. One can only imagine the advances that will be made during the tissue bank's next decade.

Learn more at **komentissuebank.iu.edu**

FAST FACTS

- More than 5,000 women have donated breast tissue and more than 11,000 women have donated DNA and blood since the bank's founding in 2007.
- Donors represent 45 states and the District of Columbia.
- Twenty-five percent of the donors represent minority populations.
- There have been more than 30 breast tissue collection events in Indiana, Illinois, Kentucky, Michigan, California, Texas and New York.
- The tissue bank is a resource to investigators around the globe, with researchers from Purdue University, Mayo Clinic, National Cancer Institute, Yale University, Dartmouth College, Dana-Farber/ Harvard University, Breakthrough Research Centre at The Royal Marsden Hospital (UK) and the University of Queensland in Australia having used samples.
- The tissue bank is a resource within the Vera Bradley Foundation for Breast Cancer Research Laboratories at IU, which includes more than 30 physicians and scientists who are focused on preventing, treating and curing breast cancer.

–Komen Tissue Bank at IU Simon Cancer Center

FROM TEENS TO TENURE, CANCER CENTER PROVIDES EDUCATIONAL OPPORTUNITIES

By Michael Schug

Can you imagine having an opportunity to work at the side of world-renowned cancer researchers while you're only in high school or just beginning your college career?

Nearly 250 young people have had such an opportunity in the past 15 years as participants in the IU Simon Cancer Center's annual Summer Research Program.

James Knight II, now a second-year student at IU School of Medicine, was admitted to the program during both his junior and senior years of high school. He had participated in science fairs, but the nine-week summer program revealed a world he had not glimpsed.

"I had never participated in research before, and I aspired to gain a better understanding of what it meant to conduct research in medicine," he said of his interest in the program.

James Knight II

So, at age 17 in 2010, he found himself in a lab "investigating where there was a connection between the serum levels of fibroblast growth factor-23 (FGF23) and the development of bone-metastatic prostate cancer in patients," he said.

Typically a high school junior doesn't get to do that sort of thing nor do they get a second opportunity to follow up on their research, but James did when he continued his work on prostate cancer research his senior year. After graduating from high school, James went to Yale University. He majored in molecular, cellular and developmental biology, with a concentration in neurobiology.

Sara Mohommad Ibrahim

While in high school, Sara Mohommad Ibrahim had done an independent research project, but she wanted a more structured program under the mentorship of a scientist.

Sara was selected for the program in 2010 when she was a senior.

"I primarily worked on a database called the Connectivity Maps (CMaps) and curated drug-target interaction information for breast cancer," she said.

Sara pointed out that her experience was so positive that she continued her research with her mentor from the Summer Research Program throughout her undergraduate years. She's now in her fourth year in the IU School of Medicine's dual degree MD/PhD program.

"I wanted to pursue a career that integrates both medical and scientific education. I wanted to pursue the unique opportunity of having a career that combines both taking care of patients and conducting long-term biomedical research," she said of her decision to enroll in the MD/PhD program.

James and Sara are just two of the young people who have gained real-world experience in a laboratory setting while they were teens through the Summer Research Program. The program offers more than lab lessons with a scientific lecture series, workshops, field trips and other planned activities.

"The goal of the program is to educate students from diverse backgrounds underrepresented in biomedical research, giving them meaningful firsthand exposure to biomedical and behavioral science careers that they might not have considered if it weren't for this program," **Hari Nakshatri, BVSc, PhD,** associate director of education at the IU Simon Cancer Center, said.

Additional educational opportunities at the IU Simon Cancer Center are designed for medical and graduate students, fellows and faculty, providing them with cancer-related training and professional development activities.

"Our educational offerings span teens to tenure," Dr. Nakshatri said. "Our goal is to provide excellent career enhancement activities, whether it's for future cancer researchers or our junior or senior investigators. Also, with increasing life expectancy and an aging population, the burden of cancer will likely increase. We need the next generation of researchers and clinicians to reduce the burden of cancer as well as to improve quality of life for cancer survivors. Our educational programs are designed to meet these needs."

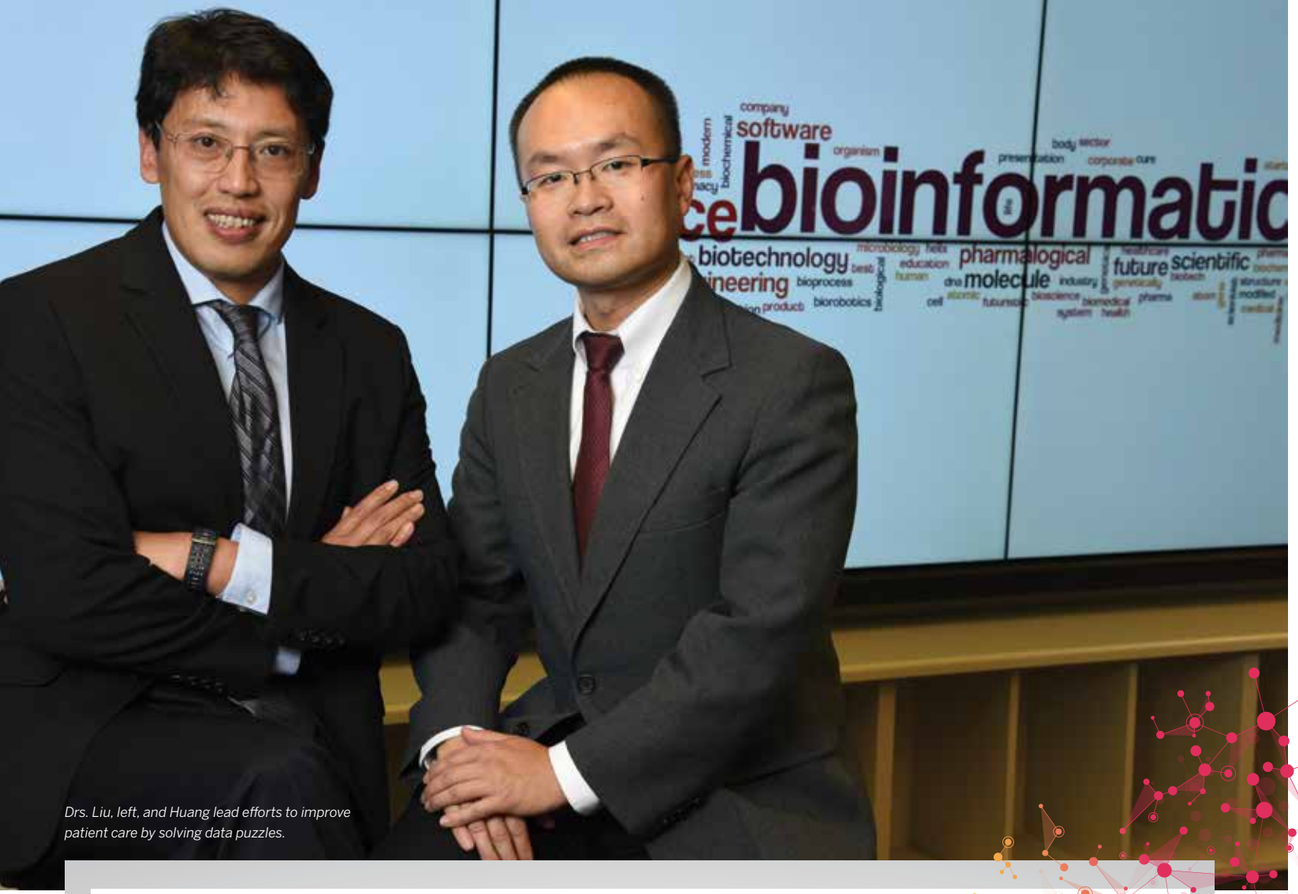
Maya Simpson, a neuroscience major, gains hands-on lab experience in the cancer center's Summer Research Program.

FAST FACTS

Educational opportunities at the IU Simon Cancer Center range from those geared for teens to seasoned scientists:

- **HIGH SCHOOL/COLLEGE UNDERGRADUATES/HIGH SCHOOL TEACHERS**
  Summer Research Program
- **PREDOCTORAL STUDENTS**
  The cancer biology minor provides interdisciplinary training for those who wish to pursue a career in cancer research.
- **FELLOWS**
  Cancer relevant fellowships range from pediatric oncology to surgical oncology and more. Other fellowships include the Vera Bradley Foundation Scholars and the Walther Embedding Program, a collaboration between IU and Purdue University.
- **JUNIOR FACULTY**
  Cancer center researchers serve as mentors to junior faculty. In all, senior cancer center researchers teach and mentor nearly 2,000 students, residents and fellows each year.
- **FACULTY**
  Educational opportunities range from a seminar series, grand rounds, symposiums and more.

–IU Simon Cancer Center



Drs. Liu, left, and Huang lead efforts to improve patient care by solving data puzzles.

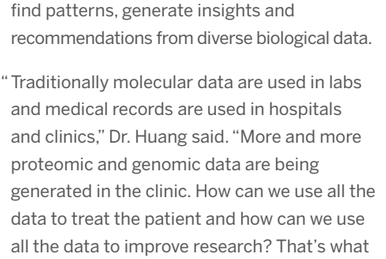
Accelerating Clinical Progress through Informatics

By Mary Hardin

Kun Huang, PhD, and **Yunlong Liu, PhD,** use tools other than petri dishes or stethoscopes to improve patient outcomes. Their tools involve biological data, computers, innovative software, databases and analytics.

They and their teams are the go-to guys for bench scientists and clinicians who need to sort through huge amounts of data to scrutinize biological puzzles and improve patient therapies.

Drs. Huang and Liu and their teams are tasked with gathering and integrating the information from molecular data, imaging data and patient records to find the common denominators—and the uncommon ones—that may hold answers to the search for a cure for cancer and other human diseases.



Cancer tissue like this holds secrets that IU data specialists hope to discover to improve patient care.

Dr. Huang joined IU in July as the director for data science and informatics for IU's Precision Health Initiative. He will develop the team of specialists required to fulfill the ambitious goal of the initiative to solidify IU's role as a leader in health research and patient-centered care.

Dr. Liu is the interim director of the Center for Computational Biology and Bioinformatics and the director of the Center for Medical Genomics, which provides high-throughput sequencing service for the campus.

Together, they are among the highly skilled bioinformatics team that IU has cultivated, but to accomplish the new goals, even more data scientists are needed. Dr. Huang is building that team of data science researchers who design algorithms to extract knowledge, find patterns, generate insights and recommendations from diverse biological data.

"Traditionally molecular data are used in labs and medical records are used in hospitals and clinics," Dr. Huang said. "More and more proteomic and genomic data are being generated in the clinic. How can we use all the data to treat the patient and how can we use all the data to improve research? That's what my team's challenge will be."

Rapid developments in technology have given rise to copious amounts of data. Organizing and storing that data, developing analytics to mine that data and producing information beneficial to clinicians is an enormous undertaking.

"Our first priority is on the clinical side: How can we help the patients?" Dr. Liu said. Bench to bedside has a whole new meaning when the bench is a computer screen sorting millions of pieces of data.

"We combine the molecular information and the clinical information and use data science so we can provide better treatment options for the patient. From that outcome, we can use the information to predict a response to treatment for other patients. We learn things from one individual that we can apply to other individuals to improve their treatment outcome. This is what data science helps to achieve," Dr. Huang explained.

The clinical team collects the genetic material such as blood or tissue samples from a patient to test for individual genetic variants. After that, the data scientists begin their work to analyze the information to see how best to treat the patient.

Building a comprehensive database will not happen overnight, but both men agree that IU has an advantage because of Regenstrief Institute's decades of experience in both developing and maintaining electronic patient records on behalf of the health enterprise in Indiana. That information provides a basis for comparison with new patient data.

"By leveraging different human resources we can build our team—interdepartmental collaboration is key to building a strong program," Dr. Huang said. "Data science is a team science."

FAST FACTS

- The IU Precision Health Initiative, announced in 2016, is a five-year, $120 million research initiative focused on patient-centered precision medicine therapies.
- Led by faculty at IU School of Medicine, including IU Simon Cancer Center researchers, the initiative will operate as five integrated virtual research clusters across the university.

  These clusters include:
  - Genomic Medicine
  - Cell, Gene and Immune Therapy
  - Chemical Biology and Biotherapeutics
  - Data Sciences and Informatics
  - Psychosocial, Behavioral and Ethics
- The Precision Health research clusters will develop new educational programs to help train the future workforce necessary for transforming health care in Indiana and beyond.
- The Precision Health Initiative is the first recipient of the university's $300 million investment in the Grand Challenges Program.

–IU Precision Health Initiative

Dr. Renbarger, team work to **unravel childhood cancers**

By Mary Hardin

Dr. Renbarger examines a slide in her lab.

Children are not just small adults. Federal regulations put in place to protect young patients, such as restrictions on inclusion in clinical drug studies, have also limited the knowledge of pediatric patient responses to therapies. That knowledge base is now expanding and one of the efforts leading the way is precision genomics at Riley Hospital for Children at IU Health.

Cancer center researcher **Jamie Renbarger, MD,** directs one of the very few pediatric cancer precision medicine programs in the country. It is a team effort, a big team, she says, pointing out that other physicians, nurses, molecular biologists, genetic counselors, pharmacologists, bioethicists, pathologists, bioinformatics experts and others comprise the team dedicated to unraveling the underpinnings that drive the most aggressive childhood cancers.

The pediatric cancer Precision Genomics Program sees high-risk patients with all types of relapsed or aggressive cancers. Genetic testing identifies the proteins, DNA and RNA in cancer cells, just as similar programs are doing with adults. However, there are important differences.

"Pediatric cancers differ from adult cancers in very significant ways," Dr. Renbarger explained. "Adult cancers are often epithelial and are often influenced by life-style factors and environmental exposures, whereas many pediatric cancers are the result of genetic abnormalities or other abnormal cells that may be present from birth. Different types of cancers affect children and adults and even those that are common to both groups are often different on very basic levels."

There also are inherent differences in how children respond to medications because their organ systems have not fully matured. Less is known about the biology of childhood cancers, but the goals of the Precision Genomics Program hope to change that. The program began seeing patients in April 2016 and already 150 high-risk pediatric patients have been treated. Actionable genomic findings with potential therapies to attack the biology of the disease have been found for about 75 percent of the young cancer patients. A complication of treatments for children is chemotherapy-related side effects. Isolating the specific patient information and determining a treatment is only part of the equation. Each child can respond differently to medications so researchers need to identify ways to predict risks for severe side effects and overall responses to guide therapy to provide the best treatment for each child.

"It is baffling how you can treat two kids who look the same and have the same type of cancer, and get dramatically different results," Dr. Renbarger said.

As long as there are questions, the pediatric precision genomics team will be looking for answers. "I don't think this approach is rocket science, but not many places have all the pieces in place for integrated precision medicine clinical care and research like we do," Dr. Renbarger said.

Collecting important clinical information about children together with their genetic data and studying that in parallel with patient tumor samples in the laboratory will help scientists pinpoint better treatments for children with cancers that are most challenging to cure.

Tissue samples from children with relapsed cancers have not been collected routinely so the precision genomics team is basically starting from scratch. Clinicians and researchers are now gathering biological samples that are then grown in animal models to test standard chemotherapies against novel, more targeted agents and innovative combination therapies. However, growing and testing in mouse models takes months, often more time than the high-risk patient can afford.

"The tragedy of where we are right now is not that there aren't drugs available, but that we are lacking the knowledge to guide use of available drugs to treat children with cancer," Dr. Renbarger said.

FAST FACTS

- Although cancer in children is rare, it is the leading cause of death by disease past infancy among children in the United States. In 2017, it is estimated that 15,270 children and adolescents ages 0 to 19 years will be diagnosed with cancer and 1,790 will die of the disease.
- As of January 2014 (the most recent date for which data exists), approximately 419,000 survivors of childhood and adolescent cancer (diagnosed at ages 0 to 19 years) were alive in the United States. The number of survivors will continue to increase, given that the incidence of childhood cancer has been rising slightly in recent decades and that survival rates overall are improving.
- The overall outlook for children with cancer has improved greatly over the past half-century. In 1975, just over 50 percent of children diagnosed with cancer before age 20 years survived at least five years. From 2007 to 2013, 83 percent of children diagnosed with cancer before age 20 years survived at least five years.

–National Cancer Institute

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 69 in the nation. The NCI-designated Cancer Centers Program recognizes that our five 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.

NCI Cancer Center
A Cancer Center Designated by the National Cancer Institute

Breast Cancer (BC) research program

The Breast Cancer research program is a highly interactive program which combines basic, translational and clinical research skills with the scientific goals of understanding the biology underlying breast cancer, and applying that understanding to improve prevention, diagnosis and treatment.

KATHY MILLER, MD
Professor of Medicine
Ballve Lantero Professor in Oncology
IU School of Medicine

HARIKRISHNA NAKSHATRI, BVSC, PhD
Marian J. Morrison Professor in Breast Cancer Research
Professor of Surgery
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Crislyn D'Souza-Schorey, PhD
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Anna Maria Storniolo, MD
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Clark Wells, PhD
Hiroki Yokota, PhD
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Siyuan Zhang, MD, PhD

Cancer Prevention and Control (CPC) research program

Cancer Prevention and Control researchers are engaged in innovative and collaborative research with the potential to decrease cancer morbidity and mortality. CPC researchers are also involved in prevention and early detection of cancer through cancer risk reduction and screening as well as preventing and reducing debilitating symptoms caused by cancer treatment while tailoring interventions to individuals.

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JIALI HAN, PhD
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Teresa Zimmers, PhD

Experimental and Developmental Therapeutics (EDT) research program

The Experimental and Developmental Therapeutics program is a multidisciplinary program that promotes and facilitates the development of new cancer therapies from bench to bedside. The scientific goal of the EDT program is to discover and develop novel cancer therapeutics, fitting well with the overall mission of the IU Simon Cancer Center.

BERT O'NEIL, MD
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Tom and Julie Wood Family Foundation Professor of Lung Cancer Research
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Kent Robertson, MD, PhD
Catherine Sears, MD
Safi Shahda, MD
Hiromi Tanaka, PhD
Adam Zlotnick, PhD

Research programs

Hematopoiesis, Hematologic Malignancies, and Immunology (HMI) research program

The goal of the HMI program is to use results from member studies to develop novel therapeutic approaches for treating patients with malignancies. These comprehensive studies include basic normal and disordered hematopoiesis, the pathophysiology of hematologic malignancies and immune cell function associated with hematopoiesis, hematopoietic cell transplantation and tumors.

G. DAVID ROODMAN, MD, PhD

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Edward Srour, PhD
Attaya Suvannasankha, MD
Mervin Yoder, MD
Ji Zhang, PhD
Baohua Zhou, PhD

Tumor Microenvironment and Metastasis (TMM) research program

The scientific goals of the Tumor Microenvironment and Metastasis program are to advance our basic understanding of the role of cancer cell stromal interactions in cancer initiation, progression and metastasis; to evaluate the functions of the metastatic niche; and to translate discoveries of the pathobiology of solid tumors, the tumor microenvironment and the metastatic niche into new cancer targets and novel therapies.

MURRAY KORC, MD

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Professor of Biochemistry and Molecular Biology
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Director
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THERESA GUISE, MD

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Heather Hundley, PhD
Travis Jerde, PhD
Melissa Kacena, PhD
Chien-Chi Lin, PhD
Xin Lu, PhD
Anirban Mitra, PhD
Sumegha Mitra, PhD
Khalid Mohammad, MD, PhD
Kenneth Nephew, PhD
Heather O'Hagan, PhD
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Ravi Sahu, PhD
Uma Sankar, PhD
Dan Spandau, PhD
M. Sharon Stack, PhD
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Ronald Wek, PhD
Kenneth White, PhD
Laura Wright, PhD
Jingwu Xie, PhD
Yan Xu, PhD
Cong Yan, PhD
Siyuan Zhang, MD, PhD

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Associate Director of Translational Research | **DAVID BOOTHMAN, PhD**

Associate Director of Clinical Research | **KATHY MILLER, MD**

Associate Director of Education | **HARIKRISHNA NAKSHATRI, BVSC, PhD**

Associate Director of Population Science Research | **VICTORIA CHAMPION, PhD, RN**

Associate Director of Administration | **MICHAEL DARLING, MHA**

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.

Shared facilities

The IU Simon Cancer Center provides its members (researchers) with access to cutting-edge equipment, technology and services with 14 shared facilities. Each facility, staffed by experts, helps members make advances in cancer research.

Angio BioCore

Karen Pollok, PhD
Director

Emily Sims
Manager

cancer.iu.edu/angiobiocore

A state-of-the-art facility that provides validated and highly-reproducible in vitro and in vivo assays to study angiogenesis, endothelial and hematopoietic cell biology and their role in normal and pathological conditions, including cancer, diabetes, cardiovascular and infectious diseases. Services provided include real-time cell-based imaging for functional studies (IncuCyte ZOOM), metabolism assays, multi-parametric flow cytometry assays and screenings for anti-angiogenic compounds.

Behavioral and Cancer Control Recruitment Core

Stephanie Wofford, MSM
Manager

cancer.iu.edu/behavioral

The mission of the Behavioral and Cancer Control Recruitment Core is to serve the needs of all cancer center investigators whose research has a behavioral or cancer prevention and control focus and involves human subjects. The core was established to optimize behavioral and cancer control research recruitment. Its purpose is to coordinate, support accrual and supervise recruitment of all approved behavioral and cancer control studies. The core provides supervised recruitment throughout the IU Simon Cancer Center, other sites and regional social networks. In addition, it provides recruiter training, communication with clinical care groups, recruitment material preparation and ongoing recruitment strategy assessment.

Biostatistics and Data Management

Hao Liu, PhD
Director

cancer.iu.edu/biostats

The Biostatistics and Data Management Core supports the research efforts of and collaborates with IU Simon Cancer Center investigators by providing biostatistics and data management expertise that includes design, conduct, analysis and interpretation on clinical trials, translational and basic science studies as well as population-based investigations.

Clinical Pharmacology Analytical Core

Jamie Renbarger, MD
Scientific Director

David Jones, PhD
Director

cancer.iu.edu/cpac

The Clinical Pharmacology Analytical Core provides services to IU Simon Cancer Center members as well as Indiana University School of Medicine faculty to assist in the:

- quantification of drugs and new chemical entities in tissues (including blood, plasma, serum and solid tissues) and on dried blood spot card
- pharmacokinetic analysis of data (noncompartmental only)
- qualitative and quantitative assessment of formulations for use with new chemical entities in preclinical studies
- measurement of metabolic stability and metabolite identification of new chemical entities
- measurement of protein binding of drugs and new chemical entities

Clinical Trials Office

Mario Contreraz, MBA, MSN, RN
Administrator, CTO

Somer Case-Eads, MA, CCRP
Administrator for Protocol Operations

Shadia Jalal, MD
Medical Director, Adult CTO

James Croop, MD, PhD
Director, Pediatric CTO

Melissa Lee, BS, CCRA
Clinical Research Manager, Pediatric CTO

cancer.iu.edu/cto

The Clinical Trials Office provides comprehensive clinical trials services to IU Simon Cancer Center members. Services include protocol review and monitoring, protocol development, data safety monitoring and data management, as well as training and supervision of staff and maintenance of research databases.

Collaborative Core for Cancer Bioinformatics (C3B)

Jun Wan, PhD
Core Director

cancer.iu.edu/bioinformatics

The Collaborative Core for Cancer Bioinformatics (C3B) is unique in that it is available to members of both the IU Simon Cancer Center and Purdue University Center for Cancer Research. The core's goal is to integrate and accelerate cancer discovery, drug discovery, precision medicine and training through a joint bioinformatics/molecular genetics/genomics initiative that will enhance research capability and form the foundation for more rapid data generation, manuscript publication and joint multi-investigator grant applications. The data analyses of C3B include but not limited to RNA-seq, ChIP-seq, whole genome bisulfite sequencing, whole exome/genome sequencing, ATAC-seq, CRISPR/Cas9 and other sequencing technologies. The core has expertise in integration of -omics data and gene network study. In addition, the C3B can help cancer center members to customize pipelines, or to develop new software/tools based on users' special requests.

Indianapolis Colts coach Chuck Pagano takes his place in the starting lineup at the 2017 Chuckstrong Tailgate Gala. The year marked the fifth anniversary since Pagano's diagnosis with acute promyelocytic leukemia as well as the fifth year of the Chuckstrong movement, which has raised nearly $5 million for IU cancer research.

Shared facilities

Epidemiology Consultation Core

Hongmei Nan, MD, PhD
Director

cancer.iu.edu/epi

The overall goal of population research is the prevention and early diagnosis of human diseases, proper treatment fitting the patients, as well as improved survival rates. The Epidemiology Consultation Core aims to promote population research and education in epidemiology at the IU Simon Cancer Center by facilitating collaborative interactions between faculty members from the cancer center and the multiple academic institutions in Indiana, thus promoting joint research projects and grant proposals related to population research.

Flow Cytometry Resource Facility

Edward Srour, PhD
Director

Susan Rice
Manager

cancer.iu.edu/flow

The Flow Cytometry Resource Facility provides flow cytometric analysis and cell sorting services including consultation, technical advice and collaboration, thus promoting the application of cutting-edge flow cytometric protocols to varied scientific needs of cancer center scientists. In addition, the FCRF provides state-of-the-art time of flight analysis using the new CyTOF2 technology, as well as single cell genomics including RT-PCR, DNA sequencing and RNA-seq based on the Fluidigm platform.

In Vivo Therapeutics Core

Karen Pollok, PhD
Director

Tony Sinn
Manager

cancer.iu.edu/ivt

The mission of the In Vivo Therapeutics Core is to provide IU Simon Cancer Center investigators with cost-effective and comprehensive services to facilitate the development and testing of novel pharmacological and cellular therapies. In addition, the core has partnered with the pediatric cancer Precision Genomics Program to develop new patient-derived xenografts from sarcoma patients being treated at Riley Hospital for Children at IU Health.

Multiplex Analysis Core

Christie Orschell, PhD
Director

cancer.iu.edu/mac

The Multiplex Analysis Core offers microplate-based bioassay systems that can perform multiplex analysis of multiple different analytes in a single sample. Multiplex systems are faster, more efficient and use less sample volume than other technologies such as ELISA and western blot. The core provides technical expertise and consultation for high-quality protein quantitation (pictogram/femtogram level), using commercially available kits or custom kits designed by the PI. Multiplex kits for phosphor-proteins and nucleic acids are also available.

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Susan G. Komen Tissue Bank at IU Simon Cancer Center

Anna Maria Storniolo, MD
Executive Director

Jill Henry
Chief Operating Officer

komentissuebank.iu.edu

The Komen Tissue Bank at the IU Simon Cancer Center is the only normal breast tissue bio-repository of its kind in the world, making it uniquely positioned to characterize the molecular and genetic basis of normal breast development and compare it to the different types of breast cancer. It was established expressly for the acquisition of normal tissues—breast tissue, cryopreserved tissue, serum, plasma and DNA—from volunteer donors with no clinical evidence of breast disease and/or malignancy, providing a resource to investigators around the globe.

Therapeutic Validation

Karen Pollok, PhD
Co-director

Ahmad Safa, PhD
Co-director

Christopher Stamatkin, PhD
Lab Manager

cancer.iu.edu/therapeutic

The Therapeutic Validation Core assists clinical investigators in the development and execution of correlative biological assays needed to validate mechanism(s) of action of candidate drugs/therapies and to develop and test new hypotheses. It also provides technical and intellectual support in the development, implementation and validation of predictive and pharmacodynamic biomarkers for novel, molecularly targeted anti-cancer agents.

Tissue Procurement and Distribution

Mary Cox
Operations Manager

Oscar Cummings, MD
Director

George Sandusky, DVM, PhD
Assistant Director

Attaya Suvannasankha, MD
Assistant Director

cancer.iu.edu/tissue

Tissue Procurement and Distribution provides samples for the discovery of new drug targets and biomarkers, the development of cancer cell lines and patient derived xenografts (PDX), and DNA and RNA research. It serves as a resource for the centralized banking of tissue, blood, bone marrow and buccal swab specimens procured from patients.

Transgenic and Knock-Out Mouse

Loren Field, PhD
Director

Hanying Chen
Core Manager

cancer.iu.edu/mouse

The Transgenic and Knock-Out Mouse Core provides services for the production of traditional transgenic mice and CRISPR-mediated knockout mice via pronuclear injection. The core also provides services for embryo and sperm cryopreservation and recovery.

INDIANA UNIVERSITY

MELVIN AND BREN SIMON CANCER CENTER

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