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Anti-cancer agent stalls growth and reduces tumor size in human trials

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New graduate program to focus on cancer care in underserved communities

### INNOVATION INSIDER FALL 2023



# Cancer Center at Illinois

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

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Innovation Insider is a Cancer Center at Illinois publication that highlights the interdisciplinary and translational work of the CCIL faculty, staff, students, and external partners. Learn more at *cancer.illinois.edu*.

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Photo Credits: Jeni Bushman (page 11), Heather Coit (page 16), and Fred Zwicky (page 8)

### DIRECTOR'S INTRODUCTION

In this issue of Innovation Insider, you will discover stories that reveal the bold ideas and brilliant innovations that make the Cancer Center at Illinois (CCIL) a special place. But the CCIL is not just ideas and innovations. **The CCIL is people.** That is why this issue features the faces of the CCIL – staff members, faculty members, and students – who are discovering more effective approaches to cancer prevention, diagnosis, and therapy. We continue to push the boundaries of cancer research, harnessing the unique capacities of University of Illinois Urbana-Champaign experts to transform cancer research, detection, and treatment.

In this issue of the Insider, you will meet leaders at the nexus of the biological sciences and engineering who are paving the way for novel approaches to cancer. You'll meet some of the CCIL's newest faculty members, Susan Leggett and Keith Jarosinski. You'll meet Tim Fan and Paul Hergenrother, who collaborated in the promising development of the anti-cancer agent PAC-1 clinical trials. You'll meet CCIL members Brian Cunningham and

Viktor Gruev, who are developing novel approaches to cancer diagnostics. You'll meet the CCIL's Hua Wang and Shuming Nie and learn how their NIH-supported cancer study is transforming immunotherapy research. In a fascinating interview with analytical chemist Jonathan Sweedler, you'll get acquainted with a CCIL member's interdisciplinary endeavors and his unlikely journey into cancer research. You'll meet students who are the fruit of the CCIL's commitment to educating and empowering the next generation of scientists and cancer researchers.

You'll also meet CCIL staff members, including Margaret Browne Huntt, who spearheads our collaboration with the College of Education for an innovative graduate program to train aspiring cancer researchers, healthcare providers, and community stakeholders to develop cancer solutions for underrepresented communities. And finally, you'll get a glimpse of the individuals who comprise a new, refreshing collaboration with OSF Healthcare that strategically aims to 'BEAT' cancer by translating the CCIL's technological advances to patients across OSF's oncological care network.

> I also want to highlight the exciting progress in our plans for the CCIL's new Cancer Center for Research and Innovation Building. We are honored to have a strong commitment from the university for this endeavor to strengthen our foundations and infrastructure at Illinois. This building will be an indispensable cornerstone of a new era of cancer research at our university; it will be a home that will further unite and strengthen us in our shared aim to fight cancer.

> > It is an honor to be a part of this dedicated community as we courageously collaborate to stem the tide of cancer's regrettable reach. The CCIL believes a cancer-free future is possible. We will continue to work together toward that end. Thank you for your partnership with us in this bold and compassionate endeavor.

> > > SINCERELY,

Rohit Bhargava

Director

**BY THE NUMBERS** 

### BYTHENUMBERS **SUMMER 2022 - SPRING 2023**

<b>250</b> - CANCER-RELATED PUBLICATIONS	- <b>1</b> C		(Full + Associate)
(in 2022) <b>20% TOP-TIER</b> (Journal Impact Factor >	10)	<b>20+</b> DEPARTMENTS	<b>5+</b> COLLEGES
RESEARCH AWARDS		12	NEW PILOT
\$26M	\$23M		PRUJEGIS AWARDED
Annual Cancer- Relevant (DC)	Annual Peer- Reviewed (DC)		<b>6</b> SEED GRANTS (\$1.2M)
AND IN THE REAL PROPERTY OF			
Č,	Ш		<b>1 PLANNING GRANT</b> (\$30K)



**Student Scholarship** Awards

**MILICA BARAC Ronald H. Filler Scholarship** 

**BLAKE PLOTNER** Kristine Neuhoff Twyman Memorial Breast Cancer Scholarship

**MYRA KAMDAR** Jonathan Groch Cancer Center at Illinois Scholarship

# **VELCOME** TO THE CANCER CENTER AT ILLINOIS

#### SUSAN LEGGETT Assistant Professor, Bioengineering, College of Engineering

Susan joined the CCIL as an associate member on January 1, 2023, as a cancer researcher in the Cancer Discovery Platforms Bridging the Engineering-Biology Continuum (CDP) program. Susan's research integrates live-cell imaging, bioengineering, and machine learning to elucidate dynamic single and collective cell behaviors that drive cancer progression. Her research has established tools to reverse-engineer tumors and comprehensively profile cancer cells' morphology, migration, and mechanics with high spatiotemporal resolution. This integrative approach enables the visualization and analysis of complex cell-cell and cell-microenvironmental interactions in heterogeneous and evolving tumors, providing insight into individual patient diseases to advance personalized medicine. Susan is also an affiliate of the Carl R. Woese Institute of Genomic Biology.

#### **KEITH JAROSINSKI** Associate Professor, Pathobiology, College of Veterinary Medicine

Keith joined the CCIL as a full member on March 1, 2023, as a cancer researcher in the Cancer Discovery Platforms Bridging the Engineering-Biology Continuum (CDP) program. Keith's research spans multiple aspects of herpesvirus-induced cancers, including host-to-host transmission, latency, transformation, and reactivation, using Marek's disease virus (MDV) in chickens as a natural translational animal model. Most herpesviruses do not cause cancer in humans and animals. Still, they occasionally can, including Hodgkin's lymphoma and Kaposi sarcoma caused by Epstein-Barr and Kaposi sarcoma-associated viruses in humans. MDV uses similar mechanisms to induce lymphocytic cancers in chickens. His lab is trying to understand how herpesviruses cause the transformation of lymphocytes that result in cancer to develop drugs or treatments that stop cancer development through these viruses.



### **DEVELOPING** THE CANCER CENTER RESEARCH AND INNOVATION BUILDING

The Cancer Center at Illinois is developing plans for a Cancer Center Research and Innovation Building (CCRIB) that **harnesses collaboration between CCIL researchers, administration, student scholars, and cancer survivors** and transforms cancer research, detection, and treatment at the University of Illinois.

#### **DESIGN PROCESS**

The CCRIB's conceptual design development follows the university's master plan and Chancellor Jones' strategic campus priorities in collaboration with campus Facilities & Services (F&S) staff and standards.

#### **BUILDING LOCATION**

The CCRIB will be east of the Beckman Institute and west of the North Campus Parking Deck on the southwest corner of University Avenue and Mathews Avenue. The new building's precise footprint size and location will be confirmed during the conceptual and schematic design phases. The general area of the new building (displayed in green) is in the adjacent picture.

#### PHASE 1

In the initial data-gathering phase, the CCIL administrative team worked closely with the architectural design team and university F&S representatives to study the site and outline an understanding of the planned uses and goals for the building.

#### PHASE 2

The CCIL, in coordination with F&S and the architectural design team, has solicited input from stakeholders in the CCIL and across campus on creating a facility that cultivates and inspires cancer research collaboration. This F&S phase has included informationgathering meeting sessions, a hybrid town hall with CCIL members, weekly campus engagement sessions, and individual meetings with key campus leaders.

#### PHASE 3

Review and selection of conceptual design options. The architectural team provides detailed costs and construction timelines to campus.

#### PHASE 4

The architectural team will provide a detailed conceptual plan for review and approval by campus leadership and University of Illinois Board of Trustees.





The CCIL is on the cusp of a significant evolution for our university's ability to conduct cancer research and influence the lives of cancer patients."

**ROHIT BHARGAVA, CCIL DIRECTOR** 

# **CANCER CENTER AT ILLINOIS**

### NIBEDITA CHAKRABORTY

#### **RESEARCH DATA ANALYST**

Nibedita Chakraborty joined the Data Management team of the CCIL in July 2020. As a Research Data Analyst at the CCIL, she collaborates with the scientists, investigators, administrative core team members, and various internal and external stakeholders to manage CCIL's cancer research data profile and infrastructure. Before joining CCIL, Nibedita worked as a Clinical Research Professional in the clinical oncology area, providing leadership in managing clinical research studies. She has extensive experience delivering data management oversight for clinical trials. Nibedita is a Certified Clinical Research Professional credential holder by the Society of Clinical Research Associates.

"Working to provide decision-making support to world-renowned scientists, educators, and other team members in our fight against cancer motivates my daily work with CCIL. My prior experience in clinical oncology research has helped me understand the broader perspectives of cancer research communities. I am excited to see how CCIL, with its collaborators, is engaged in discoveries, translational research, and finding better outcomes daily to mitigate the daunting challenge of various types of cancer. I am proud to be a part of a fantastic research team at CCIL by supporting them with analytical data support in its mission to advance cancer research to bring discoveries, solutions, and hope to our community and beyond in our collective fight against cancer."





#### **TOR W. JENSEN** BIOMEDICAL RESEARCH LABORATORY DIRECTOR

Tor Jensen received his Ph.D. from the Department of Chemical and Biological Engineering at Northwestern University in 2004. At Illinois, he has served as the inaugural Regenerative Biology and Tissue Engineering Theme Fellow in the Institute for Genomic Biology, developed collaborative projects with Carle Foundation Hospital and Research Park companies, and served as the Laboratory Manager and then Director of the Biomedical Research Center located in the Mills Breast Cancer Institute at Carle Foundation Hospital.

At the Biomedical Research Center, he has been involved in start-up companies focused on clinical diagnostics in cancer and ophthalmology. His primary interests lie in translational research and pre-clinical development and assessment of technologies with the potential to impact patient care positively. Tor also supports clinical research infrastructure at Carle Foundation Hospital.

Tor joined the CCIL team before the first National Cancer Institute site visit to review the Cancer Center Support Grant in the fall of 2018. Since that time, Tor has supported the activities of the Tumor Engineering and Phenotyping Shared Resource from its infancy.

"The primary motivation in my work at the CCIL is thinking about how basic science and engineering advances could directly impact cancer patients. The pathway from discovery to therapy can be long and complicated. I enjoy assisting researchers in moving their discoveries along that pathway toward patient care."



### TUMOR ENGINEERING AND PHENOTYPING SHARED RESOURCE LAUNCHED

The Cancer Center at Illinois and the Beckman Institute hosted the TEP Open House in fall 2022.

The Tumor Engineering and Phenotyping (TEP) Shared Resource is the largest space dedicated to cancer research on the University of Illinois Urbana-Champaign campus. TEP aims to be a one-stop shop for advice, resources, and services to support discovery or technology development with biological experiments and analyses. TEP services are available for CCIL, campus faculty, researchers, and students. Services include 2D/3D cell culture, a cell repository, gene manipulation, cell line generation, biochemical assays, cell-based assays, cell line authentication, and mycoplasma testing.

TEP maintains state-of-the-art cell and tissue evaluation facilities, utilizing standardized protocols subject to strict quality control measures for both in vitro and in vivo studies. TEP also trains students and scholars in experiments to provide expert guidance in experimental design and analysis to maximize cost-benefit ratios. TEP provides access to specialized cancer models, services, and expertise that enhance scientific interaction and productivity and provides stability, reliability, cost-effectiveness, and quality control in all its services. TEP houses cutting-edge technologies such as Seahorse XFe96 analyzer, NanoString SPRINT, BioTek Cytation 5.

In 2023, TEP began providing histological services for basic science (non-clinical) research, including processing, embedding, sectioning, and staining of animal tissues. TEP also recently acquired Quant-studio 7 real-time PCR and is preparing to install a new PhenoCycler-Fusion to allow spatial phenotyping of millions of cells at significant scale and speed.

TEP aspires to become a unique resource nationally by functioning as a "maker lab" to develop novel tumor models to accurately simulate and improve our understanding of the structure, function, and dynamics of tumors and their microenvironment.

### ANTI-CANCER AGENT PAC-1 Shows promise In human Clinical trials

A phase I clinical trial of PAC-1, which spurs programmed cell death in cancer cells, found only minor side effects in patients with end-stage cancers. The drug **stalled the growth of tumors** in the five people in the trial with neuroendocrine cancers and **reduced tumor size** in two patients. It also showed some therapeutic activity against sarcomas, scientists and clinicians report in the British Journal of Cancer.

The drug was first identified and developed as an anti-cancer agent by CCIL scientists at the University of Illinois Urbana-Champaign.

The clinical trial findings are noteworthy because of testing completed in a small number of patients with advanced disease, said clinical study director Arkadiusz Dudek, an oncologist with the HealthPartners Cancer Center at Regions Hospital in St. Paul, Minnesota, and Mayo Clinic in Rochester, Minnesota. The trial enrolled cancer patients with advanced diseases without other treatment options. Phase I clinical trials test whether a new drug compound produces adverse side effects or toxicities in human patients. The clinical trial—and another trial testing PAC-1 against brain cancer involved patients and clinicians at three institutions: Regions Hospital, the University of Illinois Chicago, and Johns Hopkins University. The trial included patients with colon cancer, breast cancer, pancreatic cancer, adenocarcinoma, melanoma, and others.

Phase I clinical trials track side effects in patients who receive low doses



Our strategy is to figure out which tumor type is the most sensitive and pursue that. We are very excited about the results in neuroendocrine tumors because there are not many drugs available for that disease.

of the tested compound. If the drug is well tolerated and causes no discernible toxicities over a month, the amount is incrementally increased. This process can take several months before patients receive a potentially therapeutic dose, said Dr. Oana Danciu at the University of Illinois Cancer Center in Chicago, who led the clinical trial.

University of Illinois researchers first identified PAC-1 as a potential anti-cancer compound in the early 2000s when they discovered it could switch on a suppressed pathway in cancer cells. The first step of this pathway involves the conversion of procaspase-3, a protein found in most cells, into caspase-3, an enzyme that, when activated, initiates programmed cell death.

Led by CCIL Deputy Director Paul Hergenrother, a professor of chemistry, the team also recognized that greater procaspase-3 in occurs abundance in many cancer cells relative to healthy tissues. That characteristic, and its tendency to not be activated in cancer cells, made it a good target for anticancer therapies.

In animal trials involving pet dogs with spontaneously occurring lymphomas, meningiomas, and osteosarcomas, Hergenrother and CCIL researcher Timothy Fan, a professor of veterinary clinical medicine, found that an early formulation of PAC-1 had anti-cancer effects. Their work in cells and animals set the stage for human clinical trials, initiated previously with funding from an anonymous angel investor. Hergenrother founded the biotechnology company Vanquish Oncology to lead the effort.

The clinicians are seeking further funding to move the drug into phase II clinical trials, involving many more, much healthier patients with very similar cancer profiles

"Our strategy is to figure out which tumor type will be the most sensitive and pursue that," Dudek said. "So we are very excited about the results in neuroendocrine tumors because there are not many drugs available for that disease."

More results are expected from a phase I clinical trial of PAC-1 in patients with glioblastoma multiforme, an aggressive

form of brain cancer with only one drug available. In the new clinical trial, the team combined PAC-1 with this drug, temozolomide.

In previous studies, the researchers discovered that PAC-1 crosses the bloodbrain barrier, essential for any brain cancer treatment. They also saw promising results of PAC-1 in combination with the drug temozolomide and radiation in pet dogs with brain cancer.

If clinical trials reveal that PAC-1 is therapeutic against one or more cancer types and the drug is approved for use in those populations, it will be less costly to test it against other cancers. An approved medication also can be prescribed for "off-label use" by doctors who think their patients might benefit from adding it to their cancer-treatment protocols. The team now awaits the results of the new clinical trials and the desired outcome of PAC-1 drug approval.

### CANCER CENTER AT ILLINOIS SCIENTISTS BREAK IMAGE TECHNOLOGY BARRIERS

The Center for Label-Free Imaging and Multi-Scale Biophotonics (CLIMB) is a joint effort between CCIL researchers Stephen Boppart, a professor of electrical and computer engineering and bioengineering; Mark Anastasio, a professor of bioengineering; Rohit Bhargava, a professor of bioengineering; and the late Gabriel Popescu, former professor of electrical and computer engineering.

The center's primary goal is to create optical and computational imaging technologies that can serve as a resource for clinicians and other investigators in the biological and medical sciences. The interdisciplinary team members initiated the idea almost three years ago, drawing inspiration from the growing recognition of label-free biomedical optical imaging as a unique study area.

"Traditionally, people have used dyes, stains, and labels in microscopy to provide contrast, but those can be toxic and interfere with the cells and the very processes we are investigating. The questions arose: 'What signals can we extract from cells, molecules, and tissues in a label-free manner? What are their inherent optical properties?' If we can take advantage of that, it can lead to many benefits," Boppart said.

One of those benefits is that technologies developed for label-free microscopy can immediately be incorporated into human studies, allowing researchers to demonstrate their clinical applications efficiently. This benefit is an advantage over the dyes, stains, or optical probes used in traditional imaging applications, which are considered drugs that must be FDA-approved before use with human patients.

"With light, we have the power to look at molecules and cells, but we also have to think about how that's useful on a larger physical scale," Boppart said. "The challenge becomes: 'How do we capture



With funding from the National Institute of Biomedical Imaging and Bioengineering at the National Institutes of Health, CCIL scientists are establishing **a new national collaborative Biomedical Technology Research Resource** to develop label-free optical imaging technologies for medical and biological

technologies for medical and biological applications.

new microscopic data in one small field of view, and then apply it to the very large macro scales in humans?"

The center's three major technology research and development projects include qualitative phase imaging, in vivo clinical imaging, and artificial intelligence.

"The use of artificial intelligence and computational methods to enable and advance label-free imaging is a unifying theme in the center," Anastasio said. "This will change the way that measurement data are acquired and improve the formation and analysis of microscopy images."

In addition to developing new technologies in the lab, the fiveyear award enables collaboration projects, service projects, education, outreach, and training. "We are intentionally thinking about outreach and diversity," Boppart said. "We are working with other groups on campus to increase the pathway for underrepresented minorities to get interested in optics, biophotonics, and research."

The launch phase of the program will focus on raising visibility for the center as a resource, organizing research collaborations, and initiating new training for graduate students. By year five, the

researchers hope to demonstrate that the technologies are being used widely and making a broad impact nationwide.

The group was about to receive word of their funding in June 2022 when Popescu suddenly and unexpectedly passed.

"We're very humbled by what Gabi was able to do in his own research, and in the development of CLIMB," Boppart said. "He was such an inspiration to bring groups together, and the center is the result of his efforts. For as long as this goes, we'll see this center as a tribute to his legacy." The use of artificial intelligence and computational methods to enable and advance label-free imaging is a unifying theme in the center. This will change the way that measurement data are acquired and improve the function and analysis of microscopy images."

MARK ANASTASIO, PROFESSOR OF BIOENGINEERING



# **LIKE PEANUT BUTTER AND CHOCOLATE:** RESEARCHERS PAIR TWO NOVEL EFFECTS FOR MORE EFFECTIVE CANCER BIOMARKER DETENTION

Researchers from CCIL Program Leader Brian Cunningham's lab, in collaboration with researchers at Washington University, have demonstrated a **new capability to detect and count individual biomolecules** at low concentrations. This technology may significantly improve the efficacy of current cancer detection and measurement methods. Biomarkers play a significant role in diagnostics because their presence and quantity correlate to the presence of diseases like cancer. Low signal-to-noise ratios hamper current biomarker detection technology, posing a threat to cancer diagnostics, especially for patients whose cancer therapies can cause a reduction of detectable biomarker quantities in their system.

"To address this limitation, our team designed and developed

a technique that leverages photonics to amplify the signal and enhance the testing capabilities. Our goal was to provide a more sensitive protein detection platform, ultimately leading to better diagnosis and treatment of diseases," said project member Priyash Barya.

Cunningham's team successfully met their goal, achieving an unprecedented ultrasensitive detection limit for protein biomarkers as low as 100 femtograms (fg) per milliliter (ml) (a femtogram is 10-15 grams).

"This kind of detection limit is not achievable with other technologies, except for one other that uses a complex procedure and expensive instrumentation that isn't viable for

point-of-care cancer diagnostics," said Cunningham. "The ability to go down to concentrations this low is like pulling back the waters on the beach. Formerly hidden things are now visible. This method provides us with more information for early cancer detection and also for seeing the effects of cancer therapy on protein biomarkers that otherwise wouldn't be known."

How does the new method work? "It's like chocolate and peanut butter," said Cunningham. "Our new biomarker detection technology combines two great things to make something even better."

First, the team at Washington University led by Prof. Srikanth Singamaneni created plasmonic fluors (PF), or gold nanoparticles decorated with fluorescent dye molecules. These PFs absorb light efficiently from a specific laser wavelength that couples the

### This method provides us with more information for early cancer detection and also for seeing the effects of cancer therapy on protein biomarkers that otherwise wouldn't be known.

energy into the fluorescent dye molecule. The PF then becomes a tag for protein molecules. While PFs are ordinarily bright, researchers still need an expensive

microscope to see them. But Cunningham's team wanted to detect individual PFs, and to accomplish this feat, they performed the detection on the top of a photonic crystal (PC) designed to capture the same wavelength of light (in the laser) also used to excite the PF. The PF then piggybacks onto the PC with the biomarker present. Then the team efficiently couples more energy into the PF, increasing its brightness and enabling single-molecule detection.

A second novel effect gave the researchers an advantage – the emitted photons followed a well-defined path and direction

dictated by the PC. The team chose a microscope with an appropriately wide aperture to efficiently capture this light. When combining this ability to visualize the brightness with the ability to see individual biomolecules, you get that 'chocolate and peanut butter' dynamic duo that distinguishes this new biomarker detection technology (see figure).

While it sounds complex, this new technology is inexpensive to manufacture, and the detection methodology is quite simple, requiring no additional enzymes for amplification, such as those used with PCR tests.

The Cunningham lab also recently published research on a new biomarker detection method for mRNA

molecules, another type of biomarker that provides different information about cancer. With the mRNA biomarker detection, an amplification effect allowed even lower detection limits. One might wonder if these new biomarker detection methods work together. "We are thinking about that, actually. For example, we could combine light-emitting nanoparticles with these amplification methods," said Cunningham.

"When we began this research endeavor two years ago, I was very interested in the concept of plasmonic and photonic coupling and its role in fluorescence enhancement," said Priyash. "However, what particularly motivated me was the prospect of utilizing our method to enhance the sensitivity of current diagnostic capabilities. The possibility of contributing to advancements in diagnostics and potentially improving patient outcomes was a driving force for my involvement in this research."

Where do things go from here for the team's research? "Our method could be easily translated to a straightforward and affordable optical instrument that promises to improve the sensitivity of present diagnostic capabilities. With enhanced sensitivity and accuracy in protein detection, it has the potential to contribute to early disease diagnosis and enable more efficient and timely treatments," said Priyash.

Now that the team has demonstrated the principle of this new method, they will seek clinical collaborators who will pilot this technology's capability for biomarker detection at small concentrations. The team will also apply for additional funding and continue collaborations with Washington University in St. Louis, Missouri.



Light captured efficiently using the Cunningham lab's novel ultrasensitive protein detection method appearing in the center of the image, like the "eye of Sauron."

### NOVEL CAMERA TECHNOLOGY MAY TRANSFORM SURGICAL PROCEDURES FOR CANCER PATIENTS

#### An innovative camera technology **inspired by the mantis shrimp's visual system** has the potential to transform intraoperative surgical procedures for cancer patients, allowing clinicians to receive more information during biopsies and detection procedures.



Developed by CCIL scientists Viktor Gruev and Shuming Nie, this promising discovery led to a \$9M PO1 award from the National Cancer Institute in which researchers at the University of Pennsylvania, Purdue University, and Johnson & Johnson will also collaborate on innovations that synergize with the camera technology and lead clinical trials with lung cancer patients at Penn Medicine.

"There are gaps in the current imaging technologies and contrast agents used in the operating room," said Gruev. "This grant is taking a holistic approach, bringing a team together that can address the technology and also work with and receive honest feedback from surgeons."

Over the past decade, Gruev, professor of electrical and computer engineering, has been collaborating with Illinois colleagues across disciplines to re-create the mantis shrimp's complex visual system in a single device that would provide doctors with a multi-spectral view – allowing surgeons to see the tumor's exact location. This technology serves multiple purposes, offering surgeons better images during a biopsy and when performing an endoscopy, a procedure in which a cameralike instrument is inserted into the body to detect diseases like cancer better.

"One of the strengths we bring to this project is the ability to miniaturize the device for these procedures. Professor Gruev's lab has been able to eliminate the need for multiple cameras in an operating room with this single device," said Nie, professor of bioengineering. "And they have also been able to create a camera that is minimally invasive when inserted into the body."

This P01 award will allow Penn Medicine doctors to utilize Illinois researchers' camera technology when conducting bronchoscopies on patients to detect and diagnose lung cancer. In addition to the camera advancement, the Illinois team is



CCIL researchers pose with a prototype image-guided surgical system (standing third from left is Viktor Gruev, and fourth from left is Shuming Nie).

wielding augmented reality to improve the information surgeons receive. Gruev's lab has created goggles that will provide 3D visualization to doctors during surgery.

"Receiving substantial support from the National Cancer Institute is a validation of the importance, urgency, and potential impact that this bio-inspired imaging technology will have on the world. This project is an excellent example of how engineers are working in collaboration with clinicians to ultimately transform the future of cancer care and improve patient lives," said Rohit Bhargava, CCIL Director.

The camera's success in previous clinical trials has opened the door for

additional future partnerships. The Illinois team is working with the grant's co-PI Timothy Fan, CCIL research program leader professor of veterinary clinical medicine, to establish clinical trials with animal patients.

"From the clinical side, we want to ensure that this technology is easy to use and understandable, and that is actually a valuable tool for doctors," Gruev said. "And from the patient

This project is an excellent example of how engineers are working in collaboration with clinicians to ultimately transform the future of cancer care and improve patient lives. side, of course, we want to make sure that all cancer cells are removed from their body the first time they have a surgical procedure. Our ultimate goal is to improve the quality of life for cancer patients."

## CANCER CENTER AT ILLINOIS RESEARCHERS DEVELOPING TARGETED CANCER IMMUNOTHERAPIES

Hua Wang, a CCIL scientist and professor of materials science and engineering, was **awarded a Research Project grant from the National Cancer Institute (NCI)**, which will support the development of type 1 conventional dendritic cells (cDC1) targeted cancer vaccines and cytokine therapies through the integration of immune cell homing materials and metabolic glycan labeling.



CCIL researchers Hua Wang (left) and Shurning Nie (right) will take their cancer research collaboration to the next level with their \$2M+ NCI grant.





Wang, the grant's principal investigator, said his team would design macroporous materials with independently tunable pore size, mechanics, and chemokine release kinetics and decipher the role of each parameter on the immune cell homing profile to rationally design materials, which can program immune cells of interest, like cDC1s.

"The cDC1s being recruited to the macroporous materials can then be metabolically labeled with chemical tags via a metabolic glycoengineering process of unnatural sugars, prior to their migration to the lymph nodes," Wang said, adding that this will allow his team to specifically target tumor immunomodulatory agents to the cDC1s in lymph nodes.

The five-year grant, which comes on the heels of Wang's lab research receiving a Bridge Grant from the Cancer Center at Illinois, supports his partnership with Shuming Nie, a Grainger Distinguished Chair, professor of bioengineering,

As a member of CCIL, I am committed to contributing to our cancer research community and pursuing our shared goal of improving human health.

and a co-investigator of the NCI grant. For Wang and Nie, the funding will further their collaboration to advance cancer research with CCIL.

"The combination of world-class basic science and engineering with veterinary oncology models can greatly accelerate research that benefits human health," said CCIL Director Rohit Bhargava. "The CCIL is very pleased to support the exceptional team of Professor Wang and Professor Nie, who will make cancer immunotherapy better."

Nie, whose interdisciplinary academic research lab works in cancer nanotechnology focusing on in vivo cancer imaging and image-guided surgery applications, said the grant would allow his lab to start new projects in biomolecular imaging and immune engineering.

"This new NCI grant with Professor Wang has opened opportunities for us in cancer immunotherapy, especially in characterizing the microporous materials he developed in using our imaging expertise to help understand the mechanisms of immune cell homing and activation, and in exploring cuttingtechnologies edge for combining immunotherapy and surgery," Nie said Wang, who credits the CCIL with supporting his research since he began working at The Grainger College of Engineering in 2020, looks forward to working with colleagues to build a new immunology working group within the center. He also hopes to bring together laboratories to explore cancer immunotherapy.

> "As a member of CCIL, I am committed to contributing to our cancer research community and pursuing our shared goal of improving human health," Wang said.

Weishan Huang, assistant professor of immunology at Louisiana State University's School of Veterinary Medicine, is a second co-investigator of the grant. She will bring her expertise in immunology, especially T cell and dendritic cell biology, said Wang.

### CANCER CENTER AT ILLINOIS MEMBER BRINGS SINGLE-CELL CHEMICAL MEASUREMENT EXPERTISE TO CANCER RESEARCH

Jonathan Sweedler, a research member with the first cohort of CCIL's JumpStart Program and Professor in Chemistry and the Neuroscience Program, is the **recipient of a \$1.5 million NIH grant for installing a high-end mass spectrometer** that will allow his lab to provide Illinois faculty and other NIH researchers with more sensitive and informative single-cell and tissue imaging experiments.

#### CAN YOU TELL US A BIT ABOUT YOUR BACKGROUND, JONATHAN?

It's hard for me to say this, but I've now spent 32 years here at Illinois. I'm a chemist who works in neuroscience, endocrinology, and other areas using mass spectrometry approaches to measure the molecules within and around cells and small tissues to see how they change as a function of health, behavior, and disease. The thing that makes our group a little unusual is that the chemical characterization techniques and protocols we use are created by our group. With analytical chemistry and bioengineering aspects of our group research, we create new techniques; more specifically, we've really pushed new approaches for single-cell chemical measurements.



#### WHY ARE SINGLE-CELL MEASUREMENTS IMPORTANT?

Whether it's the brain, where differences between cells drive brain function, or in development biology, where different cells create new organs, the differences between cells determine their function. In the case of cancer, you might want to know about the initial cells showing signs of cancer before they proliferate and to determine how these initial cancer cells impact surrounding cells.

#### WHAT IGNITED YOUR WORK IN CANCER RESEARCH?

I've always tried to avoid well-populated research areas. I have looked at cancer research and thought of it as beyond my ability to compete. However, I realized that other groups do not make the single-cell chemical measurements that we do, so we started considering cancer research. When we were approached about looking at a tumor model to examine cell heterogeneity, I realized we could make measurements of the differences between the cells within a tumor; we do see striking differences between the cells.

We have a tool in our group that emphasizes the chemical state of the cells. That is important information for cancer research. as we should be able to follow how a new drug impacts the individual cells in a tissue and the drug's effect on the cell.

A cell has a genome and a transcriptome; the cell transcripts encode its proteins. The measurement of single-celled transcripts is a fairly well-developed field, and singlecell proteomics has made great strides. It's the metabolome - the small molecules themselves - that tell you the state of the cell. The metabolome is being recognized as the most dynamic part of the cell, and it's the class of molecules we have the least ability to measure.

Just recently, Nature named singlecell metabolomics as one of the seven technologies to watch in 2023, and they highlighted the unique work we are doing. So, our technique fits in very well with trying to understand how cells go bad during cancer.

#### HOW DID YOU GET INVOLVED WITH THE CCIL AND THE JUMPSTART PROGRAM?

Well, with our recent progress in the singlecell area, Rohit Bhargava and others said to me, "You know, you should really be applying this to cancer biology." The JumpStart Program funds are partially supporting two graduate students to try initial experiments on applying our mass spectrometry-based approaches to cancer-related projects. Thus, the JumpStart program is leading to new collaborations and new proposals. The JumpStart Program has allowed me to take a small part of our group and 'test the waters' of cancer research. It has worked really well.

#### WHAT WOULD YOU SAY TO OTHER ILLINOIS SCIENTISTS NOT INVOLVED IN CANCER RESEARCH?

If your expertise is biological technology, bioengineering, chemistry, or other areas, consider if you can have an impact on cancer research. Through the CCIL, there may be funding to test your ideas. Perhaps more importantly, there's expertise and a growing group of people here who are willing to work with you.

#### WHAT HAS BROUGHT YOU JOY IN YOUR STORIED **CAREER HERE AT ILLINOIS?**

I came here from California and thought this was a great place to start my career. I expected to spend five or six years here and move back. Here I am 30 years later. And one of the things that Illinois offered is a wonderful collaborative work environment and the opportunity to work outside of my primary discipline. My group has created analytical chemistry approaches that don't really care what cell they are characterizing. So, whether it's a human cancer cell, or a neuron from a rat, or a sea slug, we can measure it. This has led to some interesting collaborations. For example, Gene Robinson convinced us almost twenty years ago to explore peptides in the honeybee, and we learned how neuropeptides change as a function of bee behavior. We have since explored samples from cows, pigs, songbirds, crabs, sea urchins, comb jellies, and many more. These collaborative studies highlight what Illinois has to offer. This partnership with the CCIL is another great example of this here at Illinois.

# CANCER CENTER AT ILLINOIS AND OSF HEALTHCARE UNITE TO **'BEAT' CANCER**

On March 30, 2023, the CCIL and OSF HealthCare System held a kickoff reception at the College of Veterinary Medicine to announce the launching of the **Breakthrough Engineering and Advanced Treatment** (**BEAT**) of Cancer Research Initiative. The BEAT Cancer Research Initiative is a new strategic collaboration between the CCIL and OSF to transform cancer care delivery by translating breakthrough CCIL technological advances to patients across OSF's statewide network of oncology care.

CCIL Program Leader Tim Fan joined CCIL Director Rohit Bhargava and James McGee of OSF in sharing their expectations of this exciting initiative. Peter Constable, Dean of the College of Veterinary Medicine, shared enthusiasm for the ongoing collaboration with the CCIL. Vice Chancellor for Research and Innovation Susan Martinis concluded the evening by expressing her support for this new strategic collaboration.

Representatives from the CCIL, the College of Veterinary Medicine, and OSF HealthCare gather at the BEAT Cancer Research Initiative kickoff.



### DEAN MARK COHEN NAMED Founder Professor In Engineering

CCIL researcher Mark Cohen, Carle Illinois College of Medicine Dean, was recognized as a Founder Professor in Engineering. This distinction acknowledges Cohen's **outstanding contributions to engineering**, particularly the partnership of engineering and health care.

"This professorship will allow me the opportunity to further advance my research in tissue engineering and cancer drug development that will translate into new therapies for patients in the future," said Cohen. "It is also an important conduit to exemplify the deep connection between The

Grainger College of Engineering and the Carle Illinois College of Medicine, the world's first Engineering-Based Medical School."

This professorship, first made possible by The Grainger Engineering Breakthroughs Initiative, is designed to support multi- and interdisciplinary study and promote innovative projects. Cohen's impressive career made him a standout candidate for this professorship; he has been a leading surgeon, a clinical and translational scientist, an entrepreneur, and an educator. His work has included the development of novel therapeutics with anolides for anticancer applications, nanoparticle drug delivery systems, and more, all while contributing extensively to medical research.

His other professional interests include improving clinical operations, telehealth, and ambulatory care—thereby giving patients the best possible care regardless of where they are when needed. Cohen is also passionate about using mixed and virtual reality to improve the student training experience and many facets of endocrine surgery, including thyroid surgery and the surgical care of patients with melanoma.

> "I have been very fortunate to be able to participate in multidisciplinary research in bioengineering and medicine over the last twenty years, as well as opportunities to mentor and train incredibly talented engineering and medical students in their research and career development. And I would like to personally thank Dean Rashid Bashir, Professor Mark Anastasio, members of the promotions committee, our donors to the Grainger College of Engineering, who have made this professorship possible, as well as my family, colleagues, collaborators, mentors, trainees, and mentees who have supported me and whom I have had the privilege of working with over the years. I look forward to the great work we will do together in the future to advance both medicine and engineering," said Cohen.

# FACULTYAWARDS



#### WAWRZYNIEC DOBRUCKI NAMED INAUGURAL NEIL AND CAROL RUZIC FACULTY SCHOLAR

CCIL researcher Wawrzyniec Dobrucki was named the inaugural Neil and Carol Ruzic Faculty Scholar by the Carle Illinois College of Medicine (CI MED). The Neil and Carol Ruzic Carle Illinois College of Medicine Fund supports named faculty appointments for the Carle Illinois College of Medicine, with appointees holding expertise in engineering medicine.

As the inaugural faculty scholar and Health Innovation Professor at CI MED, Dobrucki has expertise in preclinical molecular imaging, and his professional interests include developing novel targeted multimodal imaging strategies to noninvasively assess tissue microenvironments and various biological processes in vivo, including therapeutic neovascularization, atherosclerosis, neoplastic progression, and cancer response to experimental therapies. Dobrucki will hold this appointment for five years.



#### PENGFEI SONG RECEIVED NSF CAREER AWARD

CCIL researcher Pengfei Song, professor of electrical and computer engineering, received the National Science Foundation CAREER Award in January 2023 for his research in superresolution ultrasound imaging. The CAREER award is the most prestigious award presented by NSF to support faculty who exemplify the teacher-scholar role through research and education and their integration in the context of organizational missions. The annual award includes a federal grant for research and education activities for five consecutive years.



#### MEI SHEN NAMED 2023 SLOAN RESEARCH FELLOW

CCIL scientist Mei Shen, professor of chemistry, was among 126 early-career researchers receiving the 2023 Sloan Research Fellowships from the Alfred P. Sloan Foundation. The awards "honor extraordinary U.S. and Canadian researchers whose creativity, innovation, and research accomplishments make them stand out as the next generation of leaders."

Shen received a two-year \$75,000 fellowship to advance her research. Shen's research focuses on the interface between nanoscience, electrochemistry, and neuroscience—specifically involving the study of neurotransmission of nanoscale biological structures. Her lab aims to develop new analytical methods for addressing pressing challenges in neuroanalysis.



CCIL Program Leader Brian T. Cunningham, professor in electrical and computer engineering, was selected by Optica as the 2023 recipient of the Michael S. Feld Biophotonics Award.

Established in 2012, the Feld Biophotonics Award recognizes innovative and influential contributions to biophotonics, regardless of career stage. Cunningham's innovative and transformative research in optical sensing, spectroscopy, and microscopy, as well as his leadership and entrepreneurship in the technology development of photonic crystal biosensors, led to his receiving the award.

### STUDENTAWARDS



**JANET SORRELLS** P.E.O. SCHOLAR AWARD & ILLINOIS INNOVATION AWARD

Janet E. Sorrells, a researcher in CCIL Program Leader Stephen Boppart's Biophotonics Imaging Laboratory and a Ph.D. student in bioengineering, was one of 110 doctoral students in the U.S. and Canada selected to receive a \$20,000 Scholar Award from the Philanthropic Educational Organization Sisterhood. Janet also won the 2023 Illinois Innovation Award from the Technology Entrepreneur Center and the Grainger College of Engineering. Sorrells received a monetary award of \$20,000 from Grainger Engineering.



#### **SOURYA SENGUPTA** JOAN AND LALIT BAHL GRADUATE STUDENT AWARD

TiME Program Trainee Sourya Sengupta received the Joan and Lalit Bahl Graduate Student Award, a graduate fellowship established by Dr. Lalit R. Bahl and Kavita Kinra in the Electrical and Computer Engineering Department.



#### **LILY WENGER** 2023 BECKMAN INSTITUTE UNDERGRADUATE FELLOWSHIP FOR SUMMER RESEARCH

Lily Wenger, an undergraduate student in biochemistry, received a 2023 Beckman Institute Undergraduate Fellowship to fund interdisciplinary research this summer. Lily's faculty collaborator is CCIL scientist Jefferson Chan, with whom she has developed a novel probe to explore the linkages between the tumor microenvironment and cancer stem cells.



#### RENAN A. ROJAS-GOMEZ 2023 THOMAS AND MARGARET HUANG AWARD FOR GRADUATE RESEARCH

Renan A. Rojas-Gomez is a Ph.D. candidate in electrical and computer engineering and collaborates with CCIL scientist Minh Do. The Thomas and Margaret Huang Award for Graduate Research supports graduate students studying human-computer intelligent interaction. The Huang Fund supports the \$3,500 award.



#### VARSHINI MURUGESH AND LYDIA TAYLOR CLARE BOOTH LUGE RESEARCH SCHOLARS

Cancer Scholars Varshini Murugesh and Lydia Taylor were named Clare Booth Luce Research Scholars—a distinguished award given to eight undergraduate women each year seeking to study or teach science, mathematics, or engineering. Eight women undergraduates are selected each year as Clare Boothe Luce Research Scholars who become part of the Illinois Scholars Undergraduate Research program and work closely with a faculty sponsor and graduate student mentor on research projects.

# **GIANT GRANT** EMPOWERS STEM OUTREACH

The CCIL welcomed a new STEM outreach partnership with the Stephens Family YMCA's Y on the Fly afterschool program during the spring 2023 semester.

With funding from the Grassroots Initiative to Address Needs Together (GIANT) grant awarded by the IDEA Institute with the Grainger College of Engineering, the CCIL formed this strategic alliance to provide STEM educational programming for youth in the context of an existing community service organization.

The CCIL's education and outreach team gave STEM lessons for K-5 students twice monthly at the Y on the Fly afterschool venue in Champaign, IL. The GIANT funding allowed the CCIL to purchase materials and equipment, hire and train undergraduate outreach assistants, and present the program's achievements at the ASEE- American Society for Engineering Education section conference.

"I enjoyed getting to know the students, Y staff, and volunteers over the semester. The students looked forward to our visits, and their excitement and engagement grew with each lesson. It was apparent they were retaining the material from week to week," said CCIL's Educational Programs Manager and Instructor Kristin Giglietti, who established and oversaw the program and trained the outreach assistants from the Cancer Center at Illinois Student Organization.

"Kristin has done an amazing job interacting with the Y on the Fly students. Looking ahead, we are eager to continue the partnership with the YMCA in fall 2023, and we are making plans to establish an additional community program focused on middle school students," said Marci Pool, the CCIL's Assistant Director for Education.

The CCIL believes that by engaging with STEM outside the formal classroom through programs like the one at Y on the Fly, the next generation of students will discover interest, passion, and confidence in STEM. Additionally, this program presents an excellent opportunity for CCIL's undergraduate students to gain STEM outreach and communication experience.

"I hope we can continue this partnership in the years to come because our participants truly enjoyed the CCIL volunteers and the hands-on learning experience," said Y on the Fly Director Capricia Whittaker.



Cancer Center at Illinois Student Organization outreach assistants Nina Soofi, Kevin Meier, and Brigitte Joyce.

### ZEYNEP MADAK-ERDOGAN NAMED ASSOCIATE DEAN IN THE GRADUATE COLLEGE

CCIL researcher Zeynep Madak-Erdogan, associate professor of food science and human nutrition, was named associate dean in the Graduate College at the University of Illinois. As Director of the Women's Health and Metabolism Laboratory, **she combines the study of endocrinology and metabolism with molecular and cellular biology** to understand how health and nutrition impact the cause, progression, and treatment of breast cancer.

> During her career, Madak-Erdogan has mentored both undergraduate and graduate students and participated in several graduate training programs designed to introduce students and postdoctoral researchers to cancer research careers. She is an innovative thinker, recruiting students from different areas of expertise to creatively work together to solve problems. Committed to supporting educational and career outcomes for her students, she has led initiatives that provide professional training opportunities that extend beyond the university to address critical societal issues and reach special populations.

> A former Graduate College Executive Committee member, she joined the Graduate College as a Faculty Fellow in fall 2022 to serve as part of the dean's leadership team and to advise the dean broadly on topics related to graduate education.

As associate dean, Madak-Erdogan will continue collaborating with the Graduate College on graduate student success and resilience projects and supporting initiatives that facilitate best practices and resources for mentoring.

# UNDERREPRESENTED COMMUNITIES TO BENEFIT FROM NEW CANCER EDUCATION PROGRAM

The CCIL and the College of Education (COE) are collaborating on a new graduatelevel online Campus Graduate Certificate (CERT) program to train aspiring cancer researchers, healthcare providers, and community stakeholders in **developing and implementing cancer management solutions and interventions for underrepresented communities.** The CERT program is now open for enrollment.

The CERT program will also prepare participants to design and conduct studies to measure the change in response to cancer management interventions in underrepresented communities. In an interview with the COE, CCIL Assistant Director for Strategic Research Initiatives and Chief Diversity Officer Margaret Browne Huntt shared her insights into the need for such a program.

#### WHAT ARE THE NEEDS THAT LED TO DEVELOPING A CANCER EDUCATION AND Management program specifically aimed at underrepresented and diverse communities?

Disparity in cancer research, treatment, and rates, particularly in underrepresented communities, is a challenging reality that demands timely actions. These actions should be interdisciplinary in order to be effective and sustainable. In looking at the current offerings, we realized that there was a gap that we could fill through a collaborative partnership with the CCIL and COE.

#### **HOW WILL THIS PROGRAM MEET THOSE NEEDS?**

In addition to training individuals to design cancer management implementation solutions, the program will train students to identify factors that impact the application of cancer management innovations across multiple levels, including patient, provider, clinic, facility, organization, and often the broader community and policy environment.

#### HOW DOES THE PROGRAM CONTENT HELP STUDENTS UNDERSTAND THE NEEDS of the underrepresented?

The program is designed to meet individual needs based on understanding one's background. Program content is designed to discuss the biological, social, socioeconomic, personal, and organizational components of underrepresented communities. There is that level of flexibility to allow entry to individuals based on one's positionality.

### HOW WILL ATTAINING THIS CERTIFICATE IMPACT A PERSON'S PROFESSIONAL CAREER?

We hope the CERT program's training will inspire people to pay attention to cancer care disparities from the perspective of educational engagement and changes in underrepresented and underserved communities. If such inspiration leads to professional growth, it would be great! I can see the recipients of this CERT contributing to the roles of health education specialists, social workers, community organizers with a focus on healthcare, advocates for underrepresented and underserved communities and their healthcare, consultants for community empowerment and change, cancer researchers, cancer care providers, and more. One thing I am sure of is that this line of career will be safe from the workforce automation that we have been seeing recently. We hope the CERT program's training will inspire people to pay attention to cancercare disparities from the perspective of educational engagement and changes in underrepresented and underserved communities."

MARGARET BROWNE HUNTT, Assistant director for Strategic Research Initiatives and chief Diversity officer

# **WHERE** ARE THEY NOW?



#### LAUREN SARGEANT CANCER SCHOLARS PROGRAM (2014-2018), ILLINI 4000 CYCLIST (2018)

During her time with CCIL, Lauren was a member of the inaugural cohort of the Cancer Scholars Program, during which she worked in Gregory Underhill's Cell and Tissue Engineering Lab on projects focused on the cellular microenvironment and cell signaling and mechanical cues involved in differentiation of liver progenitor cells.

"The Cancer Scholars Program provided invaluable experience, including exposure to great mentors with whom I continue communicating. Though I am not currently working in the cancer arena, so much of my prior experience has been shaped by cancer, so it remains one of my primary motivators in pursuing medicine. I am now considering a medical career in oncology where I hope to humanize patient care and therapeutic delivery as a patient advocate while also leaning upon my experience with bioengineering research and innovation."

After graduation, Lauren worked at Epic as a customer-facing technical engineer, leading her team's efforts from the beginning of the COVID-19 pandemic as an integral part of the Epidemic Preparedness Response Team. This period reminded Lauren of her desire to work more directly in healthcare and innovation. In 2022, she moved on to a position with Biosense Webster in their Cardiovascular and Specialty Solutions division, where she works closely with electrophysiologists in the EP lab, creating real-time, 3-D electroanatomic maps of patients' hearts to identify, diagnose, and treat cardiac tachyarrhythmias. This work in the clinic has further confirmed Lauren's commitment to healthcare and desire to influence patients' lives directly. She is currently applying to medical schools.



#### **RUIBO WANG** TIME PROGRAM MEMBER (2016)

"The training I received in the TiME program was valuable for helping me build a multidisciplinary background, giving me the breadth to understand

other people's work and boost collaboration. Communicating and collaborating effectively helps me in my career where I interface with biologists and biochemists."

Ruibo currently works for Illumina in San Diego, CA, as a research scientist developing new next-generation sequencing (NGS) platforms for the market. Illumina's NGS platforms are used in many cancer research and diagnostics areas, including the multi-cancer early detection test, an emerging cancer screening tool to help identify early-stage cancer by analyzing methylation patterns of cell-free DNA in blood samples using NGS analysis. While Ruibo doesn't work directly in cancer research or treatment, he enjoys developing surface materials for Illumina's products—including the NextSeq 2000 series and NovaSeq X series platforms—which are enabling advancement in genomic-related spaces, including cancer diagnostics, single-cell research, spatial genomics, mutiomics, and more.



#### MONIKA KIZERWETTER CANCER SCHOLAR (2016-2020)

"The CCIL introduced me to cancer research and helped me start working in immunooncology. I was so interested in the work throughout my

undergraduate years in the Cancer Scholars program that I chose to remain in the field and make a career out of it. I hope to continue to engineer better therapeutics for cancer for many years, especially in immunology."

Today, Monika is pursuing a Ph.D. in Biomedical Engineering at Johns Hopkins University, where she enjoys working on emerging cancer therapeutics that will one day improve patients' lives. Her work is rooted in improving chimeric antigen receptor therapy in both T cells and natural killer cells to push the boundaries of cell therapeutics for cancer. During the summer of 2023, Monika worked in the oncology R&D division at Pfizer.

# STUDENT SPOTLIGHT



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My goal is to impact the lives of patients and staff positively. Professionally, I aim to become an oncologist able to help support those in their darkest times.

#### BLAKE PLOTNER Kristine Neuhoff Twyman Memorial Breast Cancer Scholarship

Black Plotner is an honors student studying molecular and cellular biology, class of 2025. He is a dedicated researcher in the Katzenellenbogen lab, where he studies methods of treating metastatic breast cancer utilizing a type of cell death called ferroptosis. Blake also volunteers in the Champaign-Urbana community, including Carle Hospital.

"My goal is to impact the lives of patients and staff positively. Professionally, I aim to become an oncologist able to help support those in their darkest times. This scholarship will allow me to continue doing what I love."



Milica Barac is a James Scholar studying bioengineering, class of 2024. She is a Cancer Scholar, a Mayo Clinic Summer Undergraduate Research Fellow, and a part of Illinois Scholars Undergraduate Research. Milica is also a student researcher in CCIL researcher Andrew Smith's lab, head instructor for Kinesiology 104, an instructor for the Learn-to-Skate program, and a resident advisor. She volunteers with the Food Assistance & Well-Being Program and the Avicenna Community Health Center.

"It was an honor to receive this award, but it was an even greater honor to meet Mr. Filler and hear the wisdom he had to share. His dedication to giving back inspires me to do the same one day. This award was truly a blessing, and I am very grateful for the Cancer Center at Illinois, Mr. Filler, and his family."



Myra Kamdar will graduate in December 2023 with psychology and molecular and cellular biology degrees. Myra is the CCIL-Student Organization president, a Cancer Scholar, and a researcher in the lab of CCIL scientist Zeynep Madak-Erodogan.

"I plan to attend medical school to become a gynecologic oncologist. This scholarship support means a lot to me as it shows that I have found a great family in the Cancer Center at Illinois. It impacts me financially and personally, as I have a great passion for the oncology field, and this scholarship fuels my dreams to create my impact on this field."



#### UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN CANCER CENTER AT ILLINOIS

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