

ARKANSAS BIOSCIENCES INSTITUTE



2026 ANNUAL REPORT

COVER IMAGE

The illustration depicts the X-ray crystal structure (PDB entry 9MOJ) of the 4-protein GINS complex from the organism *Saccharolobus solfataricus*. Cells cannot begin replicating their DNA until a helicase enzyme that separates the two strands of the DNA double helix is activated. In eukaryotic and archaeal organisms, the central engine of this helicase is the minichromosome maintenance (MCM) complex. In eukaryotes, the GINS complex combines with the MCM complex to form a large and stable protein structure as a key step toward activating the DNA replication process. Archaeal organisms such as *Saccharolobus solfataricus* have a GINS complex that is related to that of eukaryotes, but the specific interactions with the archaeal MCM complex are not well understood. The X-ray crystal structure of *Saccharolobus solfataricus* GINS shows that the complex would need to transform its structure to allow it to interact with *Saccharolobus solfataricus* MCM in the same manner as in the eukaryotic structure.



Robert Eoff, Ph.D.
Director, Center for Molecular
Interactions in Cancer
Professor, UAMS

Data were collected at SER-CAT beamline 22-ID of the Advanced Photon Source, Argonne National Laboratory. SER-CAT is supported by its member institutions, equipment grants (S10_RR25528, S10_RR028976 and S10_OD027000) from the National Institutes of Health (NIH) and funding from the Georgia Research Alliance. This research used resources of the Advanced Photon Source, a U.S. Department of Energy (DOE) Office of Science user facility operated for the DOE Office of Science by Argonne National Laboratory under Contract No. DE-AC02-06CH11357.

This research was reported in: Shankar S, Enemark EJ. Structure of the *Saccharolobus solfataricus* GINS tetramer. *Acta Crystallogr F Struct Biol Commun.* 2025 May 1;81(Pt 5):207-215. doi: 10.1107/S2053230X25003085. Epub 2025 Apr 16. PMID: 40235367; PMCID: PMC12035558.

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Eric Enemark, Ph.D.
Structural Biology Core Director,
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CENTER FOR MOLECULAR INTERACTIONS IN CANCER

Cancer affects the health of millions of Americans. A deep understanding of molecular mechanisms that endow cells with malignant properties is an essential component of advancing pre-clinical studies and a key part of efforts to improve patient outcomes. Supported by award 1P20GM152281 from the NIH, the purpose of the Center for Molecular Interactions in Cancer (CMIC) is to empower researchers studying the molecular features and functional properties of biomolecules involved in the initiation, progression, and treatment of cancer by facilitating access to structural biology techniques, including cryo-electron microscopy and X-ray crystallography. The long-term goal of the CMIC is to leverage faculty mentoring, strategic recruitment, and cutting-edge structural biology resources to create a nationally recognized, self-sustaining Center in which research advances our knowledge of cancer through precise and comprehensive analyses of biomolecular events that underlie malignant disease.

ABI PARTNER INSTITUTIONS

Arkansas Biosciences Institute, the agricultural and biomedical research program of the Arkansas Tobacco Settlement Proceeds Act of 2000, is a partnership of scientists from:

- Arkansas Children's Research Institute
- Arkansas State University
- University of Arkansas System Division of Agriculture
- University of Arkansas Fayetteville
- University of Arkansas for Medical Sciences

As outlined in the Act, the purpose of the Arkansas Biosciences Institute is to conduct:

- Agricultural research with medical implications;
- Bioengineering research that expands genetic knowledge and creates new potential applications in the agricultural-medical fields;
- Tobacco-related research that identifies and applies behavioral, diagnostic, and therapeutic knowledge to address the high level of tobacco-related illnesses in Arkansas;
- Nutritional and other research that is aimed at preventing and treating cancer, congenital and hereditary conditions, or other related conditions; and
- Other areas of developing research that are related or complementary to primary ABI-supported programs.



DIVISION OF AGRICULTURE
RESEARCH & EXTENSION

University of Arkansas System



**UNIVERSITY OF
ARKANSAS**



LETTER FROM THE DIRECTOR

As the new Executive Director of the Arkansas Biosciences Institute, it is my distinct pleasure to share with you the 2026 ABI Annual Report. For almost 25 years after the Arkansas Tobacco Settlement Proceeds Act of 2000, ABI has set the bar for statewide promotion and facilitation of agricultural and biomedical research through our strategic partnership with Arkansas Children's Research Institute, Arkansas State University, University of Arkansas System Division of Agriculture, University of Arkansas at Fayetteville, and University of Arkansas for Medical Sciences.

This year's report focuses on groundbreaking research across these five institutions, from developing living heart valve transplants, to understanding how obesity and metabolic disease fuel breast cancer brain metastasis, to creating AI systems that can identify tobacco promotion targeting youth on social media. Additionally, we will look at how ABI researchers are tackling deadly fungal infections in immunocompromised pediatric patients, engineering plant-based compounds to promote healthy aging, using advanced X-ray technology to revolutionize materials research, and building the molecular-level understanding needed to make cancer therapies safer and more effective. These stories showcase the collaborative, interdisciplinary science happening across Arkansas and highlight work that is not only advancing fundamental knowledge but also training the next generation of Arkansas scientists and positioning our institutions to compete for major federal funding that will strengthen our research capacity for years to come.

By enabling research across Arkansas, ABI stimulates our local economy by facilitating the acquisition of federal and private foundation research grants and contracts, which translate into employment opportunities, recruitment of talent into Arkansas, and training the next generation of scientific talent to fuel the statewide research enterprise. As we look back at the achievements from FY25, I look forward to working with each of you to support the mission of ABI and strengthen research across all corners of our state.

In FY25, we brought in \$59 million in extramural grant awards, which represents a leverage of \$5.80 in extramural funding for every dollar in ABI funding. Since 2016, our investigators have brought in more than \$580 million in related extramural funding. These dollars have supported an average of 250-300 FTE for high-wage, knowledge-based support personnel annually.

As a native Arkansan whose career has been shaped by ABI support, I am grateful for the foundation that ABI provided throughout my career, from my undergraduate studies performing biomedical research in Kevin Raney's laboratory during my time at Hendrix College to ABI

support for my own laboratory startup as well as ABI-funded equipment to build a world-class proteomics facility. Now in my twentieth year at UAMS, ABI has continuously supported my work at UAMS and specifically enabled the expansion of our proteomics facility and the growth of my cancer-focused research program. I am committed to giving back as ABI Executive Director by supporting the growth of this statewide research enterprise.

I would also like to thank Dr. McGehee for the exceptional job he has done leading and advocating for ABI. Over his twenty years of leadership, he has elevated ABI's profile, strengthened partnerships across our five institutions, and positioned Arkansas to be a national leader in leveraging state investment for research excellence. He has set the bar high, but I look forward to the opportunity to build and expand upon the foundation he has laid. I am fully confident that there will be a seamless transition from Dr. McGehee to me for oversight of ABI and championing its mission going forward.

On behalf of the research community at the five ABI institutions and outside collaborators, we are grateful for the support of Governor Sanders, the Arkansas Legislature, and all Arkansans. With your continued support, we will continue to foster innovation, encourage collaborations, and promote agricultural, biomedical, and scientific discoveries to make a healthier Arkansas.



Alan Tackett, Ph.D.
Executive Director, Arkansas Biosciences Institute



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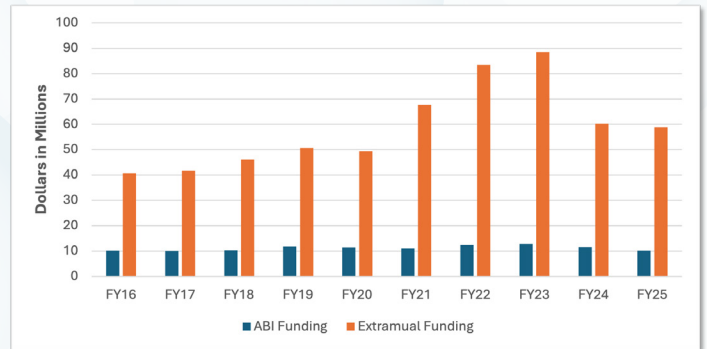
2025 PERFORMANCE METRICS

The Arkansas Biosciences Institute monitors five overall performance indicators for the long-term agricultural and biomedical research projects at its five member institutions. These performance indicators allow ABI to assess and track progress related to extramural funding, research publications, employment support, investigator recruitment, and patent activity. The following summaries and graphs highlight ABI performance in FY2025 as well as the past ten years.

ABI AND RELATED EXTRAMURAL FUNDING

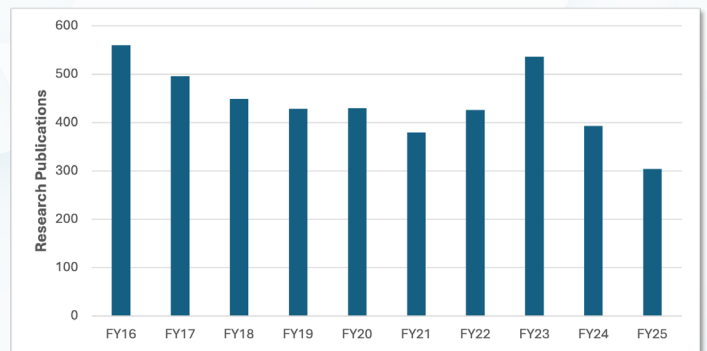
Each institution invests resources to support outstanding researchers. These investments are typically used to initiate pilot projects, hire research technicians, purchase equipment, and build collaborations. These efforts generate strong preliminary data and provide infrastructure support that make extramural grant applications more successful. Each year, ABI investigators receive funding from agencies such as the National Institutes of Health, the National Science Foundation, American Heart Association, and the U.S. Department of Agriculture. In this way, ABI-supported research investigators “leverage” their ABI funding, and this leverage is one of the key performance metrics.

In FY2025, ABI-supported research investigators brought in \$59 million in extramural grant awards. ABI funding during this time was \$10.2 million, representing \$5.80 direct return that was leveraged for each ABI dollar received. Over the last ten years, research investigators have been awarded more than \$580 million in extramural dollars from outside agencies and foundations.



ABI-SUPPORTED RESEARCH PUBLICATIONS

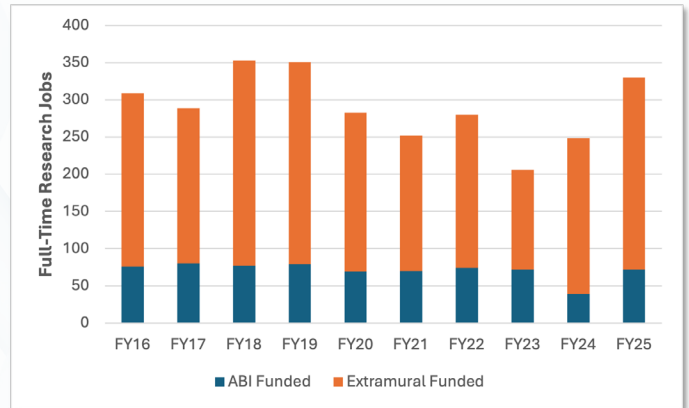
Research publications serve as the primary channel for sharing scientific findings with both the broader public and the research community. Beyond dissemination, publications function as a productivity indicator for investigators and enhance Arkansas’ national scientific reputation. ABI-supported investigators disseminate their work through peer-reviewed medical and scientific journals, textbooks, and online publications. In FY2025, ABI investigators produced 304 publications related to their ABI-funded research. Since FY2016, ABI researchers have generated more than 4,400 publications.



FTE EMPLOYMENT SUPPORTED BY ABI AND EXTRAMURAL FUNDING

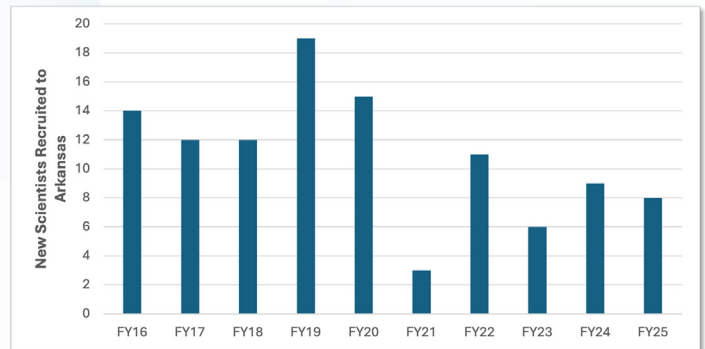
Through a combination of ABI investment and extramural support, institutions can sustain continuous employment and bridge funding gaps between grant cycles.

Since FY2016, ABI and ABI-related extramural funding from agencies and foundations have supported nearly 3,000 full-time equivalent (FTE) jobs annually in Arkansas. These specialized positions include research support personnel, biostatisticians, postdoctoral research fellows, and animal-care technicians. In FY2025, 330 full-time equivalent jobs were directly supported through ABI and ABI-related extramural funding at the five member institutions.



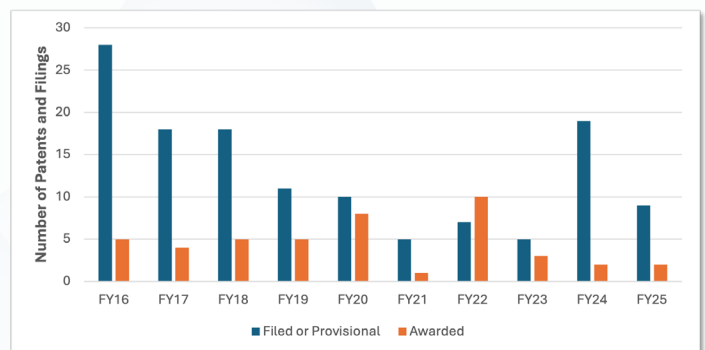
ABI-SUPPORTED RECRUITMENT OF NEW RESEARCHERS TO ARKANSAS

Recruiting experienced research investigators to Arkansas strengthens the state's long-term biomedical and agricultural research capacity. Each new faculty member brings established expertise, national research networks, and the potential to secure significant extramural funding. ABI resources provide critical recruitment support, including startup packages for laboratory equipment, initial personnel costs, and pilot project funding that helps new investigators launch their research programs. These investments build Arkansas' scientific infrastructure and enhance the state's competitiveness for future federal funding opportunities. In FY2025, eight research investigators were recruited to Arkansas with ABI support.



ABI PATENT ACTIVITY

ABI-supported agricultural and biomedical research advances scientific knowledge and frequently generates novel discoveries with commercial potential. When investigators develop unique methodologies, technologies, or applications, patent protection preserves intellectual property rights and creates pathways for translation from laboratory to marketplace. Patent filings and awards serve as indicators of innovation, entrepreneurial activity, and opportunities for economic development. In FY2025, ABI-supported research investigators filed nine patents and received two patent awards.





Director's Spotlight:

A Conversation with Dr. Larry Cornett on Two Decades of the Arkansas Biosciences Institute and Biomedical Research in Arkansas

Each year, I will identify and interview a scientific leader in Arkansas who has helped shape the research enterprise across our state. These individuals demonstrate excellence not only in their research abilities but also in their ability to serve as leaders and visionaries. For this inaugural interview of the series, I chose to chat with Larry Cornett, Ph.D., from the University of Arkansas for Medical Sciences. Over the past couple of decades, Dr. Cornett has been a trailblazer for building biomedical research capacity and training across Arkansas. Through the Arkansas INBRE grant, he has positively impacted hundreds of research faculty and undergraduate trainees across our state, which has increased our biomedical research workforce capacity and led to better-trained medical professionals in Arkansas. Dr. Cornett's various leadership roles at the University of Arkansas for Medical Sciences helped pave the way for the campus's current research successes and positive trajectory for the future. I hope you enjoy our conversation.

– Alan Tackett, Ph.D., Executive Director, Arkansas Biosciences Institute.

For more than two decades, the Arkansas Biosciences Institute has served as a catalyst for biomedical research across the state, transforming how five institutions collaborate to advance human health. Former ABI Director Larry Cornett, Ph.D., who guided the program through a pivotal era of growth, reflects on the initiative's impact, the evolution of undergraduate research training and why he remains optimistic about Arkansas' scientific future.

Alan Tackett, Ph.D.: Tell me about your early involvement with the Arkansas Biosciences Institute and the importance of having biomedical sciences included in that initiative?

Larry Cornett, Ph.D.: Well, I wasn't involved in the very beginning, and I certainly wasn't involved in all the work done to get the tobacco settlement dollars devoted to the seven areas that are currently supported. Mike Owens was the very first director, so I came along after him when the ABI was still finding its legs and figuring out what it was going to be.

It was pretty clear to me when I started that each of the five institutions involved looked at their share of the funds as theirs to spend, as long as it was spent within the boundaries of the ABI and those areas of research. That principle worked well.

The program gave Arkansas State University, the University of Arkansas System Division of Agriculture and the University of Arkansas, Fayetteville, a path toward expanding their research portfolios into work that impacts human health. That was something Arkansas Children's Hospital and the University of Arkansas for Medical Sciences had been doing for years. One of ABI's most valuable aspects early on was giving those three institutions more direct contact with biomedical scientists at ACH and UAMS.

Tackett: Was there a reciprocal benefit? What did UAMS and ACH investigators gain from increased interaction with campuses focused on other research areas?

Cornett: That's a very good question, because actually the reciprocal did operate. I've always been jealous of universities where the medical school and other professional schools sit either adjacent to or on the general campus. What investigators at UAMS and ACH miss out on is access to more basic scientists like chemists, physicists, psychologists and social scientists who can provide expertise that can't always be found at an academic health center. The ABI helped scientists at UAMS and ACH establish connections with A-State, the U of A and the UADA in order to find collaborators they just couldn't find at their institutions.

Tackett: Fast forward to today. Do those relationships still exist, or has the infrastructure that's been built become more sustainable on its own?

Cornett: With ABI funding, the five institutions have developed more infrastructure and capacity to do what they want to do on their own, which is great. That should be the goal. However, there are still opportunities for investigators at all five institutions to continue to collaborate and work together. Each institution brings a unique perspective to the overall ABI program. Because of the ABI and the resources it provides, the five institutions are better positioned to conduct meaningful research that impacts human health.

Going forward, I would like to see investigators from all five institutions continue to work together. When multidisciplinary teams work together, you have better chances of being successful in a research program, especially when it comes to larger collaborative grants. If scientists from all five institutions come together on a project that's ambitious and collaborative, the chances of impactful outcomes are probably better than if one or two investigators at one institution take it on by themselves.

Tackett: Can you point to a key event at one of these partner institutions that put them on a positive trajectory?

Cornett: The building at A-State was pivotal in getting them to where they are now. The investments in faculty, especially investigators with NIH-funded research experience, were also critical. Hiring NIH-funded scientists and creating endowed positions through ABI were very beneficial in the early days. They brought attention to the institutions and helped with recruitment of strong scientists.

Tackett: Let's shift gears to research training across the state. The NIH IDeA Program has been instrumental in how we train the next generation of biomedical researchers across Arkansas, and ABI support has been instrumental in receiving NIH IDeA funding in Arkansas. Tell me about the origins of the program and the success it has had.

Cornett: First, some background information. I doubt that it is widely known, but the NIH IDeA Program as we know it today and the ABI were both started at nearly the same time. The NIH IDeA flagship programs, Centers of Biomedical Research Excellence (COBRE) and IDeA Networks of Biomedical Research Excellence (INBRE), were started in 2000 and 2001, respectively. Voters in Arkansas approved the Tobacco Settlement Proceeds Act in 2000, and the ABI Board had its first meeting in January 2002. The training of the next generation of biomedical researchers is a lengthy process. It starts with exposing children to science, technology, engineering and mathematics (STEM) disciplines during the K-12 years, and continues by creating and maintaining strong training programs in the STEM disciplines at both the undergraduate and graduate levels at our colleges and universities.

And of course, an essential component is the presence of active research programs led by talented and highly motivated scientists. The co-development of NIH IDeA-funded programs in Arkansas along with the ABI was in my opinion critically important in creating ways for students to explore training opportunities and careers in biomedical science. Over the years, ABI support has provided seed funding that has enabled Arkansas scientists to explore new areas of research and be more competitive for extramural grants that fund the expansion of their research programs. In turn, these research programs become the training ground for students seeking STEM degrees. The NIH IDeA programs, specifically the INBRE and COBREs, are designed to provide research opportunities for undergraduate students, graduate students, postdoctoral fellows and junior faculty. Thus, in Arkansas, ABI- and NIH IDeA-funded programs have had a synergistic effect on the expansion of biomedical research capacity.

At the graduate and postdoc level, there were other sources of funding and programs already in place to support that training. But at the undergraduate level, especially for students at institutions that didn't have a lot of research opportunities, we felt like this was a place where we could make a real difference. The IDeA program has been very successful over the years. We've trained hundreds of students through that program, and many of them have gone on to graduate school, medical school, or other professional programs. Some have gone directly into the workforce in biomedical research-related positions.

The program has been very successful in giving students across all five institutions opportunities to get hands-on research experience, which is really critical if you want to recruit people into biomedical research careers. I'm really proud of what the IDeA program has accomplished, and I hope it continues to be a strong component of the ABI program going forward.

Tackett: How has the INBRE program evolved over the 20-plus years it's been in existence and under your direction?

Cornett: The numbers have stayed pretty consistent over the years in terms of the number of students we've been able to support. What's changed is the breadth of the students we've been able to recruit into the program. In the early days, we were probably drawing from a traditional pool of students who were interested in science and research. But over time, we've been able to reach out to students from institutions that maybe didn't have a lot of research opportunities, and that has really strengthened the program.

The other thing that's evolved is the structure of the program itself. In the early days, it was pretty much just a summer research experience for students. But over time, we added components like academic year research opportunities, mentoring components, professional development workshops and activities. So, the program has become much more comprehensive in what it offers students beyond just the hands-on research experience.

The networking opportunities the program has provided have also been really important. We would have an annual symposium where all the IDeA students from across the state would come together and present their research. That was really valuable because it gave students a chance to see what their peers were doing at other institutions, network with each other and interact with faculty from across the state. Those kinds of experiences are really important in helping students see themselves as part of a larger scientific community.

Tackett: You started out as a faculty member at UAMS doing your own research, then transitioned into various administrative and leadership roles. How did that

transition happen and what has that meant for you professionally?

Cornett: Like a lot of people who end up in administrative roles, I didn't necessarily set out to do it. I was a faculty member doing my own research, and I was happy. But opportunities came along, I was asked to take on various leadership roles, and I said yes to some of them. Over time, I found that I really enjoyed the administrative side of things, especially when it came to program development and helping other people achieve success in their research.

The ABI director position was really pivotal for me because it gave me an opportunity to work across institutions, to work with a group of scientists with wide-ranging expertise and to really think strategically about how to build research capacity in the state. I found that work to be really rewarding. I felt like I was able to have a broader impact on the research enterprise in Arkansas than I could have just working in my own lab.

The INBRE program was particularly rewarding because I got to see firsthand the impact that research training can have on students. That really motivated me to continue in that administrative role, because I could see the difference these programs were making in students' lives and in their career trajectories.

The downside, of course, is that when you take on administrative roles, you have less time for your own research. That's a trade-off you have to make, but I felt like the work I was doing through ABI and the INBRE program was important enough and worth it.

Tackett: Looking forward, where do you see biomedical research in Arkansas going? What are the opportunities and challenges?

Cornett: I think there are a lot of opportunities. One of the things that's really changed in the last several years is that there's much more recognition at the national level that you don't have to be at a top-tier R1 institution on the coasts to do really good biomedical research. There's much more appreciation now for the contributions that can be made by scientists at institutions in the middle of the country, in states like Arkansas.

That's reflected in funding opportunities from NIH and other agencies that are specifically targeted at building research capacity in states that have historically been underrepresented in the biomedical research enterprise. So, there are more opportunities now than there have been in the past for scientists in Arkansas to compete successfully for federal funding and to build strong research programs.

The challenge is that we have to continue to invest in the infrastructure and the people to take advantage of those opportunities. We need to continue to recruit talented scientists to Arkansas. We need to continue to invest in research facilities and equipment. We need to continue to support training programs that develop the next generation of biomedical researchers. All of those things require sustained investment, and that's where programs like the ABI are really critical.

The other challenge is that biomedical research is increasingly collaborative and interdisciplinary. We need to continue to foster those kinds of collaborations, both within institutions and across institutions. That's where Arkansas actually has an advantage because we're a small state, and so it's easier for scientists at different institutions to connect and collaborate than it might be in a larger state.

We need to continue to make the case to the public and to policymakers about why biomedical research is important and why it's worth investing in. Sometimes people think of research as something that's esoteric or disconnected from real-world problems, but the reality is that biomedical research directly impacts human health and quality of life. We need to do a better job of telling that story and showing people how the research being done in Arkansas is making a difference in people's lives.

Tackett: Do you think there's room for additional investment in biomedical research in Arkansas beyond ABI?

Cornett: Absolutely. The more investment we can make in biomedical research, the better. One area where we could use more investment is translational research, taking discoveries from the lab and moving those discoveries toward clinical applications. Arkansas has made some investments in that area, but there's certainly room for more.

We could also use more investment in core facilities and shared resources. These are the kinds of facilities that provide access to expensive equipment and specialized expertise that individual labs might not be able to afford on their own. But they're really critical for staying competitive in biomedical research.

We need to continue to invest in people, not only in recruiting new faculty but also in supporting the faculty we already have. Sometimes we focus on recruitment, but retention is equally important. Making sure we're providing the resources and support that faculty need to be successful in their research is critical.

We need to think strategically about areas where Arkansas can develop real expertise and become nationally competitive. I don't think we can be excellent in everything, so we need to identify areas where we

have strength or where we have unique opportunities and really focus our investments in those areas. That's where strategic planning at the institutional level and at the state level becomes really important.

Tackett: You mentioned the increase in recognition now of the contributions that scientists in states like Arkansas can make. What's driving that change?

Cornett: The biomedical research enterprise in the United States has been concentrated in a relatively small number of institutions and geographic areas, and that concentration has left a lot of talent and potential on the table. There are smart people everywhere, including in states like Arkansas, and if we're going to address the big health challenges we face as a country, we need to be making use of all that talent.

Also, the health challenges we face are often specific to particular regions or populations. Having a more geographically diverse research enterprise means you're more likely to be studying the health problems that affect people in different parts of the country. Research on rural health issues or on diseases that disproportionately affect people in the South is more likely to be studied if you have strong research programs in states like Arkansas.

NIH and other funding agencies have recognized this and have created programs specifically designed to build research capacity in states that have historically received less federal research funding. Programs like the IDeA Program and the Established Program to Stimulate Competitive Research (EPSCoR) are examples of that and have been really beneficial for states like Arkansas.

I'm really optimistic about where Arkansas can go. There's obviously been growth in the last several years. And as long as ABI dollars continue to flow, that's a great source of funds to continue to use to build upon the foundation established over the last 20-plus years.

Tackett: As the next generation comes up and matriculates through their education, what would you tell them as they consider a career in biomedical research?

Cornett: If you decide this is a path you want to go down early on, get some experience in research. Try out a couple of different types of research, maybe different places, to see if you really like it and it's something you want to do. Biomedical research is perfect because we have so many things that need to be worked on to improve human health. It's going to be something as a career that will be around forever. Choose something you really like as your area of research. Try to choose a field where you think there's the greatest need for future research.

Robert E. McGehee, Jr., Ph.D.

ABI Investigator of the Year



Fiona Goggin, Ph.D.

University Professor, Department of Entomology and Plant Pathology
Director, Arkansas Bioimaging Facility for Agricultural Research
University of Arkansas Division of Agriculture

Fiona Goggin, Ph.D., university professor in the Department of Entomology and Plant Pathology at the University of Arkansas Division of Agriculture (UADA), has built an internationally recognized research program that addresses one of agriculture's most pressing challenges: protecting crops from devastating insect pests while minimizing environmental impact. Goggin is a leading expert on plant-herbivore interactions, and her research focuses on how plants defend themselves against aphids and nematodes, pests responsible for billions of dollars in annual crop losses worldwide.

Her laboratory explores key signaling pathways underlying resistance, including peptide signaling, reactive oxygen species, and fatty acid pathways that orchestrate plant defenses. This work extends across soybean, tomato, and *Arabidopsis thaliana* and informs integrated pest management strategies that reduce reliance on chemical pesticides while maintaining agricultural productivity.

Goggin has secured continuous extramural funding to support her research program and has published extensively in high-impact journals, earning recognition from the Southeastern Branch of the Entomological Society of America with its award in insect physiology, biochemistry and toxicology.

Additionally, Goggin has emerged as a transformative leader in faculty development and research infrastructure. As director of the Arkansas Bioimaging Facility for Agricultural Research, she oversees a state-of-the-art core facility housing advanced microscopy and imaging technologies, including confocal, epifluorescence and electron microscopy systems. The facility serves researchers across the UADA and broader university community, providing essential infrastructure and expert consultation that elevates research quality and expands investigative capabilities statewide.

As a UADA and Provost's Fellow for Faculty Mentoring, Goggin supports new faculty onboarding and mid-career leadership development through programs such as BRIDGE mentoring program and the NSF-funded ENGAGE Leadership Exploration Program. Her mentorship extends across career stages, from undergraduate students through junior faculty members.

Goggin received her doctorate in entomology from the University of California, Davis, and joined the University of Arkansas in 2001, advancing to full professor in 2011 and university professor in 2025 in recognition of her exceptional contributions and service to the University of Arkansas and UADA.

Arkansas Biosciences Institute New Investigator of the Year



Khoa Luu, Ph.D.

Associate Professor, Department of Electrical Engineering and Computer Science
Director, Quantum AI Lab
Director, Computer Vision and Image Understanding Lab
University of Arkansas

Khoa Luu, Ph.D., an associate professor in the Department of Electrical Engineering and Computer Science at the University of Arkansas, has established a research program at the intersection of artificial intelligence and real-world health challenges, demonstrating how cutting-edge computer vision technologies can address pressing public health issues. Luu leads investigations that transform how machines interpret visual information to solve problems ranging from youth tobacco addiction to precision agriculture.

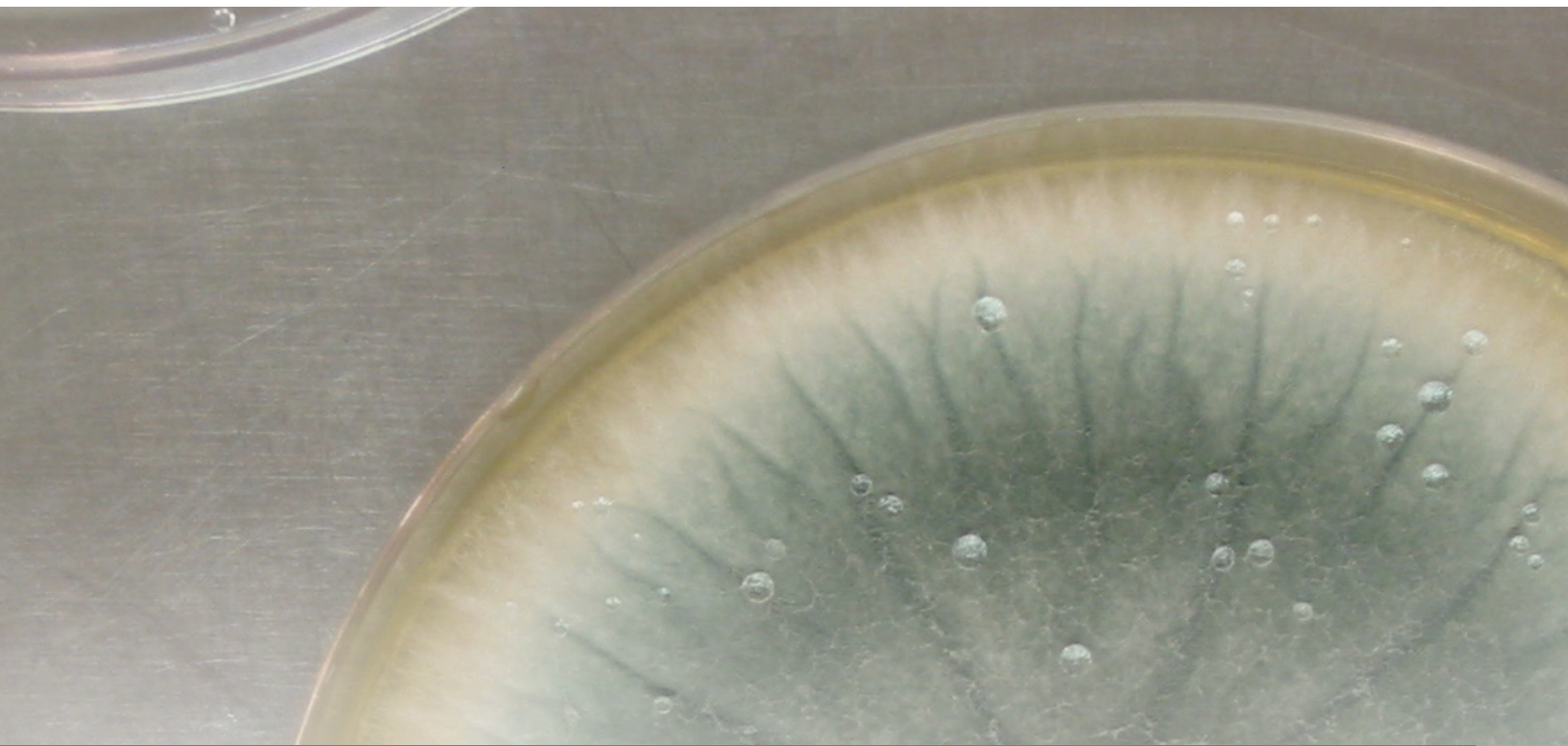
Luu's recent work illustrates the power of AI to tackle problems at a scale impossible for human analysis alone. He and his collaborators secured a \$1 million grant from the National Science Foundation to investigate how tobacco promotion on social media affects youth addiction and develop AI systems that can detect and analyze tobacco content across billions of posts, images and videos. The project employs vision-language transformers, a sophisticated architecture that allows machines to understand how images and words combine to convey meaning, while incorporating critical safeguards for fairness, privacy and adaptability.

Since founding the Computer Vision and Image Understanding Lab in 2018, Luu has built a research portfolio that spans autonomous driving, quantum machine learning, precision agriculture and biometric privacy protection. His laboratory has secured competitive

funding from the National Science Foundation, Google Research, the Arkansas Biosciences Institute and the U.S. Department of Agriculture. Recent achievements include developing foundation models for automated insect identification in crop management and creating AI-powered systems for understanding nutrition through machine vision.

Luu's scholarly contributions have earned him recognition at the highest levels of his field. He serves as area chair at the Conference on Neural Information Processing Systems (NeurIPS) and presents research annually at the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), two of computer science's most selective venues. His laboratory has published breakthrough work on applications from cerebral palsy diagnosis to robot vision for group activity understanding.

Before joining the University of Arkansas, Luu served as research project director and postdoctoral researcher at Carnegie Mellon University. His trajectory from postdoctoral researcher to associate professor leading a thriving laboratory demonstrates both scientific excellence and the capacity to build research infrastructure that elevates Arkansas' position in artificial intelligence and computer vision research.



Targeting a Deadly Fungus:

ACRI Researchers Take Aim at New Treatments for Immunocompromised Patients

William Steinbach, M.D., Pediatrician-in-Chief at Arkansas Children's Hospital (ACH) and chair of the Department of Pediatrics and associate dean for child health at the University of Arkansas for Medical Sciences (UAMS) College of Medicine, has spent his career studying *Aspergillus fumigatus*, one of the most dangerous threats facing children with weakened immune systems.

The World Health Organization recently designated this microscopic organism among the most critical fungal threats facing humanity, and Steinbach is working to improve those odds. Together with collaborator Praveen Juvvadi, Ph.D., associate professor of pediatric infectious diseases at UAMS, Steinbach has recently secured more than \$3 million in grants from the National Institutes of Health (NIH) to unravel the molecular mechanisms that make this fungus so resilient and deadly.

"For children with compromised immune systems, this research will embody Arkansas Children's mission of creating a healthier tomorrow. These findings could promise a future that many of those patients are not guaranteed today," said Steinbach.

Aspergillus fumigatus is found just about everywhere, floating through the air in decaying leaves and compost piles and living in household dust and water-damaged building materials. For healthy children, it's harmless. But for those fighting cancer, genetic disorders or other serious illnesses that suppress the immune system, the fungus can turn deadly.

The fungus has become increasingly resistant to the limited antifungal medications available. Like bacteria evolving resistance to antibiotics, *Aspergillus fumigatus* adapts and strengthens against current treatments,

leaving physicians with fewer options and making these infections challenging to treat and potentially dangerous.

Steinbach and Juvvadi believe they've identified vulnerabilities in the fungus's defenses. Their research focuses on two specific molecular mechanisms—protein phosphatase calcineurin and protein kinase A—that drive the organism's ability to grow rapidly, spread aggressively and resist medication.

The work is funded through two separate NIH awards: a five-year, \$2.8 million R01 grant and a two-year, \$438,000 R21 grant. These investigator-initiated awards reflect the scientific merit of the proposed research and strengthen the Arkansas Children's Research Institute's (ACRI) position as a leader in pediatric fungal disease research.

"We are thrilled with NIH's support of this work through two awards in the same cycle," said Juvvadi. "This funding will help us reach critical insights into *Aspergillus fumigatus*' survival strategies and bring us one step closer to developing life-saving therapies for patients as they fight this infection."

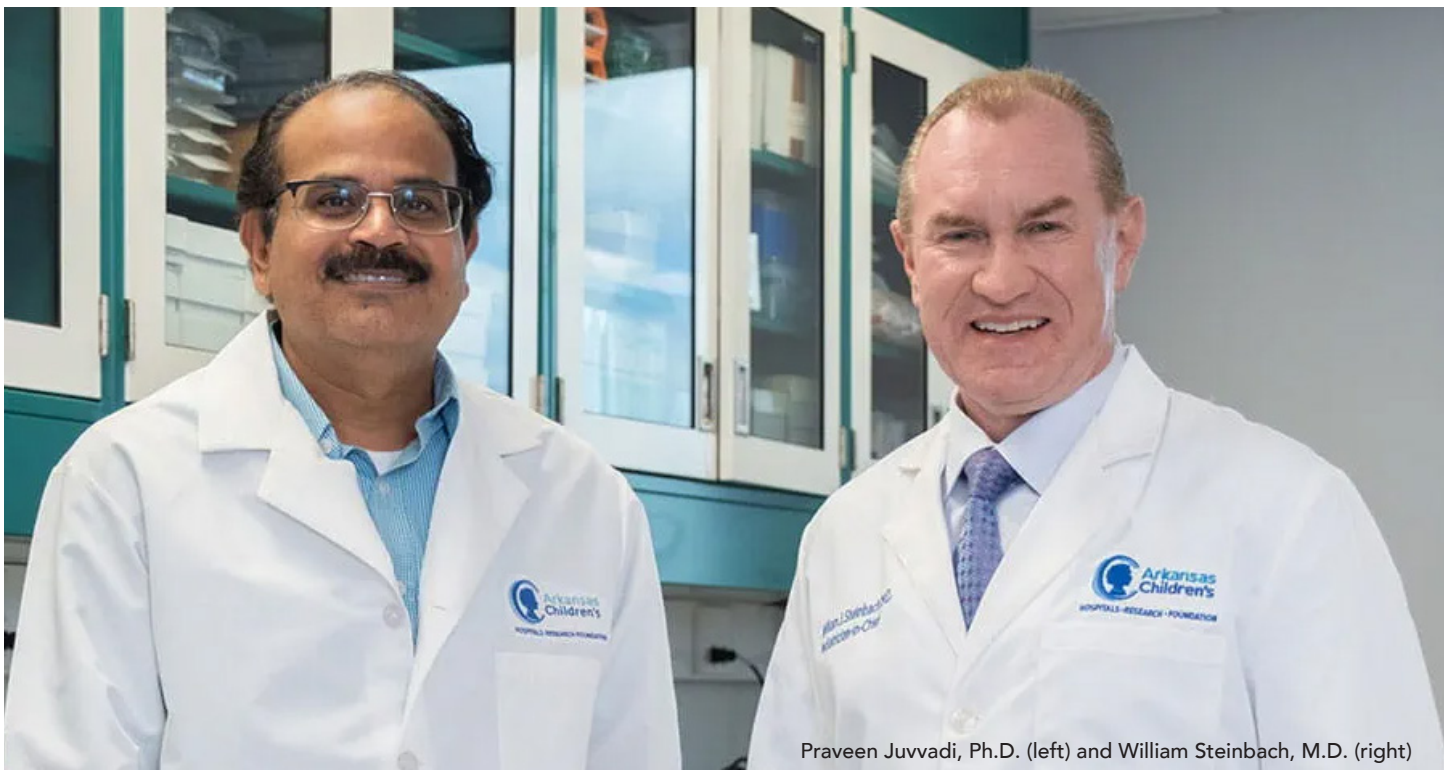
By identifying exactly which molecular pathways enable *Aspergillus fumigatus* to thrive, Steinbach and Juvvadi hope to pinpoint new drug targets for future medications to exploit. Their ultimate goal goes beyond understanding how the fungus operates to developing treatments that could protect vulnerable children.

Steinbach's leadership in pediatric fungal disease research also extends to his role as co-principal investigator of the Pediatric Fungal Network Study of Rare Invasive Fungal DisEases in Immunocompromised Pediatric Patients (PFN-STRIDE) consortium. Co-led with Brian T. Fisher, D.O., MPH, MSCE, of Children's Hospital of Philadelphia, PFN-STRIDE is part of NIH's Rare Diseases Clinical Research Network.

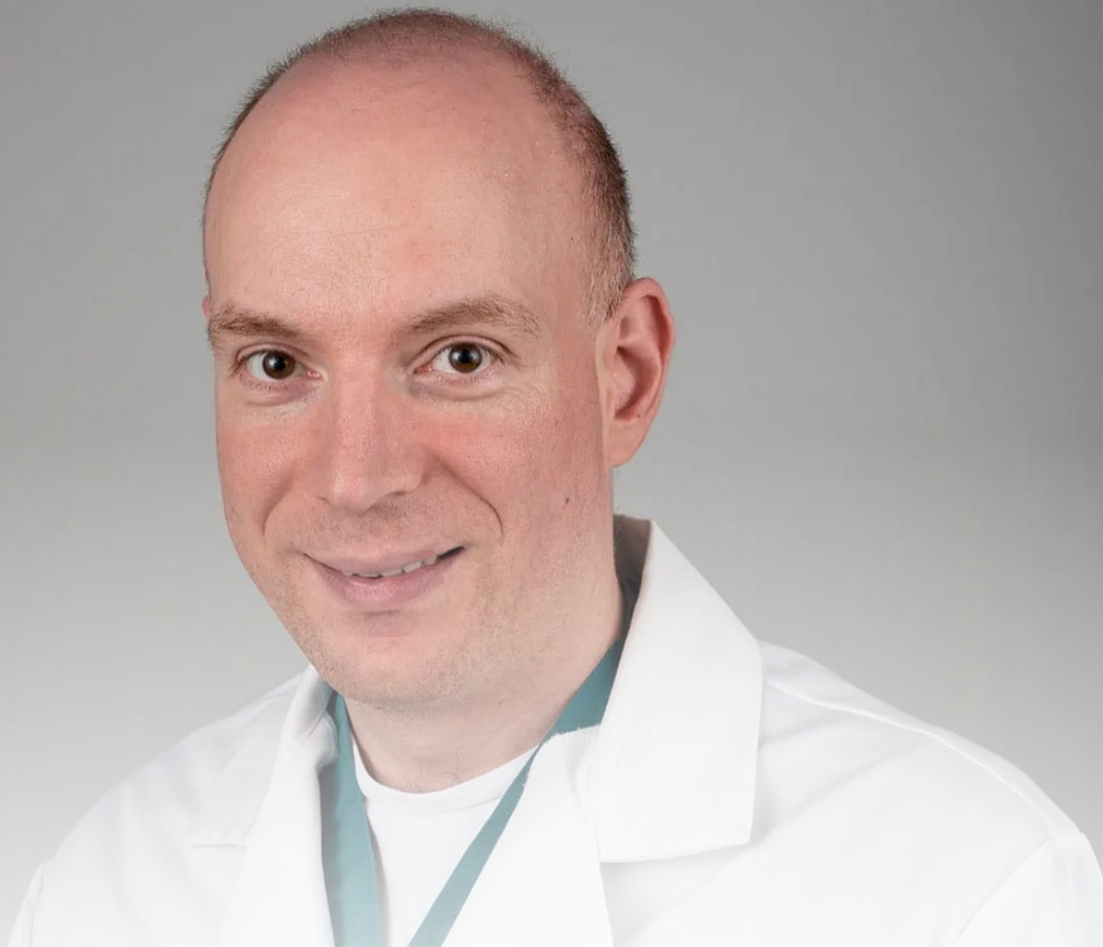
The consortium, with its administrative coordinating center at Children's Hospital of Philadelphia, connects ACH and ACRI to a nationwide network of pediatric research centers investigating rare invasive fungal diseases in immunocompromised children. This collaborative approach tackles diseases that affect too few patients for individual institutions to study effectively alone.

For families whose children are battling cancer, primary immunodeficiencies or other conditions that suppress the immune system, this research offers the possibility that infections once considered nearly inevitable might become preventable or treatable.

The work also strengthens the position of ACH and ACRI as research institutions capable of competing for and winning major federal funding for rare disease research. As Steinbach and Juvvadi begin this multiyear investigation, the molecular insights they uncover in their laboratories could eventually protect vulnerable children across Arkansas and beyond.



Praveen Juvvadi, Ph.D. (left) and William Steinbach, M.D. (right)



Growing Hearts: Pursuing a Transplant Breakthrough for Pediatric Valve Disease

Konrad Rajab, M.D., a cardiovascular surgeon at Arkansas Children's Hospital (ACH) and the Arkansas Children's Research Institute (ACRI), is working to solve a problem that has plagued pediatric heart surgeons for decades: children born with defective heart valves need replacement valves that grow with them. Mechanical valves require lifelong blood thinners and do not grow. Tissue valves deteriorate rapidly in young bodies. Both of these types of valves require repeated open-heart surgeries as children outgrow them, sometimes resulting in six or more operations before adulthood.

Rajab's work on partial heart transplantation—a revolutionary procedure that delivers living, growing heart valve implants—has earned global recognition. In 2024, National Geographic acknowledged the technique as one of seven breakthroughs that changed medicine.

One percent of children are born with congenital heart defects, and approximately one-third of those defects affect the heart valves. Some conditions, such as truncus arteriosus, where a single malformed vessel exits the heart instead of two separate ones, invariably require valve replacement.

For infants with truncus arteriosus who need immediate valve replacement, mortality rates with conventional implants approach 50 percent in the early period and exceed 15 percent per year thereafter.

Unlike traditional heart valve replacements, partial heart transplants provide children with living tissue from the valve-containing portion of a donor's heart while preserving the child's own heart muscle. The donor valves retain functional living cells, allowing them to grow, adapt and self-repair as the child develops.

"The rationale for partial heart transplantation is that the heart valves contained in pediatric heart transplants grow despite transplantation," Rajab and his co-authors explain in a comprehensive review published in *Annals of Thoracic Surgery* in 2025.

The procedure represents a fundamentally different approach to solving the pediatric valve problem. Rather than engineering tissue in a laboratory or attempting to manufacture growing valves mechanically, partial heart transplantation leverages what nature already does well by allowing the heart valves in transplanted hearts to grow perfectly in their new recipients. Rajab and his collaborators recognized that if whole transplanted hearts could achieve this, carefully selected portions of donor hearts could do the same without subjecting children to the risks of full heart replacement.

Rajab served as co-author on a landmark 2024 *JAMA* publication describing the first clinically successful partial heart transplant. As of early 2024, approximately 20 partial heart transplants had been performed worldwide at select institutions, with indications including truncus arteriosus, congenital aortic stenosis, pulmonary atresia and complex valve abnormalities.

The technical innovation is more than just the surgery itself. Rajab's research program is exploring a sophisticated preservation technique known as vitrification to make these life-saving grafts available off-the-shelf. Current preservation methods allow partial heart transplant grafts to remain viable for days in cold storage, far longer than whole hearts can survive. Vitrification could potentially preserve grafts for years, eliminating wait times for the most urgent cases and allowing surgical teams to maintain a ready supply of size-matched valves.

The research draws on multiple funding sources, including the National Institutes of Health (NIH), as well as support from foundations focused on congenital heart disease. Brian Reemtsen, M.D., professor of surgery and section chief in the division of congenital cardiac surgery for

the University of Arkansas for Medical Sciences (UAMS), collaborates with Rajab on this research at ACH/ACRI. Reemtsen is also the director of the Heart Institute at ACH.

The procedure builds on established surgical techniques. Procuring the valve graft from a donor heart requires a process similar to the Ross procedure, a well-known pediatric cardiac operation, and implanting the graft is similar to a homograft valve replacement. But the critical differences, such as ABO blood type matching, controlled preservation times and recipient immunosuppression, preserve the living cells that allow the valves to grow.

According to the *Annals of Thoracic Surgery* review, partial heart transplantation is currently in the development stage of surgical innovation, focused on refining techniques and reaching consensus on optimal approaches. Rajab's work positions ACH/ACRI at the forefront of this emerging field.

For families facing pediatric heart valve disease, the possibilities could significantly impact the way a child is treated. A successful partial heart transplant could mean one operation instead of six. It could mean a childhood without the constant shadow of the next surgery, without activity restrictions from blood thinners and without the race to reach adult size before an undersized valve fails catastrophically.

Unlike traditional heart valve replacements, partial heart transplants provide children with living tissue from the valve-containing portion of a donor's heart while preserving the child's own heart muscle. The donor valves retain functional living cells, allowing them to grow, adapt and self-repair as the child develops.

Mind Over Muscle:

Sports Medicine Researcher Explores the Psychology of Recovery

Every year, thousands of young athletes tear their anterior cruciate ligament, a critical stabilizer deep inside the knee that provides stability during pivoting, cutting, jumping and sudden directional changes. While surgery and physical therapy can repair the damage and rebuild strength, what determines whether a teenager returns to the field with confidence or whether fear and doubt sideline them permanently?

Cody Walker, DAT, LAT, ATC, CSCS, a supervisor in sports medicine at Arkansas Children's Hospital (ACH), earned the 2025 Arkansas Children's Research Institute/Arkansas Biosciences Institute Nursing and Allied Health Research Award for a study that examines whether psychological factors influence physical recovery after ACL reconstruction.

Walker's research asks a straightforward question: Do the psychological factors athletes bring into surgery—their motivation, their grit, their belief in their own success—predict how well their bodies actually heal?

What rehabilitation protocols haven't systematically measured is the mental state athletes carry into the operating room and through the months of recovery that follow. An athlete who enters surgery believing they'll return to elite competition might push harder in physical therapy than one who's already mentally preparing to quit their sport.

The study will examine preoperative psychological factors, such as motivation, perceived success and mental perseverance, and correlate them with postoperative outcomes. Those outcomes include objective measures such as knee extension strength and single-leg hop distance, as well as subjective assessments of knee function reported by the patients themselves.

If Walker finds significant correlations, the implications could reshape how sports medicine teams approach ACL reconstruction rehabilitation. Rather than applying one-size-fits-all physical therapy protocols, clinicians could integrate psychological assessments into their treatment planning. An athlete who scores low on preoperative

mental perseverance measures might benefit from additional psychological support or modified goal-setting strategies during recovery.

Parts of Walker's study will take place in the program's newly expanded facility within the Champions Pavilion, ACH's recently constructed state-of-the-art building. The timing reflects growing recognition within sports medicine that psychological factors influence physical recovery across virtually every injury type.

Elite sports programs have long employed sports psychologists to help athletes overcome mental barriers to performance. But those resources remain scarce in pediatric sports medicine, where young athletes face unique psychological challenges, including the pressure of team dynamics, the identity crisis of losing their sport, the fear of reinjury and the social isolation of sitting out a season while peers continue to compete.

Walker's research represents the kind of clinician-driven investigation that characterizes the nursing and allied health research the ACRI/ABI award was created to support. Some of the most pressing questions in pediatric health care emerge from the daily observations of nurses, therapists and other allied health professionals who spend the most time with patients during recovery.

ACL reconstruction is one of the most common orthopedic surgeries performed on adolescents, with incidence rates climbing as youth sports have become increasingly competitive and specialized. Young athletes often train year-round in single sports, increasing their injury risk. They also face immense pressure to return to play quickly, sometimes before they're physically or psychologically ready.

If Walker's research demonstrates that psychological factors predict physical outcomes, it would provide the evidence base for integrating mental health assessment and support into standard ACL reconstruction care. This kind of care would no longer be a luxury for elite athletes, but an essential medicine for every injured teenager.



New Researchers



Alicia Allen, Ph.D., MPH

Director, National Center for Opioid Research
and Clinical Effectiveness

Associate Professor, UAMS Department of Pediatrics

Alicia Allen, Ph.D., serves as the director of the National Center for Opioid Research and Clinical Effectiveness (NCOR) at Arkansas Children's Research Institute (ACRI) and is an associate professor in the UAMS Department of Pediatrics. Allen is a distinguished behavioral epidemiologist with extensive expertise in opioid use disorder, particularly in women's health and substance misuse during the perinatal period. Her research integrates epidemiological and clinical trial methods to address critical gaps in understanding how female-specific biological and psychosocial factors shape the course of addiction, with significant implications for both prevention and recovery. At NCOR, Allen provides strategic leadership to improve child health through maternal-focused interventions. Before joining UAMS, she founded and directed the Recovery through Engaging and Empowering Women Research Team at the University of Arizona. Her innovative work exploring the role of hormones and infant caregiving activities on opioid misuse during the early postpartum period recently earned her the prestigious New Innovator Award from the National Institutes of Health.

Taren M. Swindle, Ph.D.

Inaugural Director, LINK (Leveraging Implementation & eNgagement for
Knowledge Impact) Program and Core

Associate Professor, Section of Developmental Nutrition, UAMS Department of
Pediatrics



Taren M. Swindle, Ph.D., serves as the inaugural director of the LINK Program and Core at Arkansas Children's Research Institute (ACRI) and is an associate professor in the UAMS Department of Pediatrics Section of Developmental Nutrition and faculty member at Arkansas Children's Nutrition Center. Swindle's research focuses on understanding and improving health outcomes for children impacted by poverty, with particular expertise in obesity prevention and nutrition promotion for young children in low-income families. She leads efforts to increase adoption of evidence-based practices in early childcare settings through application of implementation science and community engagement approaches. Swindle received her Master of Science in Human Development and Family Science from Oklahoma State University, her doctorate in Educational Psychology and Research from the University of Memphis, and her Master of Science in Clinical Nutrition from UAMS. She recently received a prestigious Fulbright Specialist Program award to complete a collaborative project at Queensland University of Technology in Australia. Swindle has secured multiple grants from the National Institutes of Health and serves on the editorial board of the Journal of Nutrition Education and Behavior.



Edward Schmid, Ph.D. (left) and Fabricio Medina-Bolivar, Ph.D. (right)

From Plants to Fruit Flies: Arkansas Scientists Target the Biology of Aging

Fabricio Medina-Bolivar, Ph.D., and Edward Schmid, Ph.D., are investigating whether plant-based compounds rich in phenolic antioxidants can slow the aging process and prevent age-related diseases. The collaboration pairs Medina-Bolivar’s established work producing antioxidant and anti-inflammatory plant extracts with Schmid’s expertise in studying aging biology.

The research is much more than an academic exercise in understanding aging biology. Both Medina-Bolivar and Schmid are investigators with the Arkansas Biosciences Institute (ABI) in addition to their positions in the Department of Biological Sciences at Arkansas State University (A-State), positioning their work at the intersection of fundamental discovery and applied innovation.

Medina-Bolivar, a professor of plant metabolic engineering, has developed advanced bioproduction systems using hairy root cultures from medicinally important plants.

By exposing these root cultures to carefully selected stress-related elicitors, his laboratory is able to “trick” the roots into activating their natural defense responses and producing exceptionally high levels of bioactive phenolic compounds with strong anti-inflammatory and antioxidant properties.

These phenolic-rich extracts are being generated from multiple plant species with promising potential for human health applications.

Schmid, an assistant professor of biological sciences, specializes in aging and health research through the use of the fruit fly as a model. By expanding upon evolutionarily conserved hallmarks of aging, the Schmid laboratory has identified new molecular targets that may help reverse the aging process and extend organismal lifespan.

Through this collaboration, Medina-Bolivar and Schmid are testing several plant-derived extracts to determine how they influence lifespan, overall health and critical molecular markers associated with aging.

“This innovative partnership paves the way for future funding and the development of next-generation nutraceuticals to improve health and quality of life,” said

Medina-Bolivar.

A key contributor to the project is Amit Raj Sharma, Ph.D., a postdoctoral research associate at A-State, whose work has been instrumental in both the production of the phenolic-rich extracts and the implementation of the fruit fly studies. His contributions have helped bridge the plant bioproduction and in vivo testing components of the project, making the partnership especially productive.

An important partner in this effort is Nature West, Inc., an Arkansas biotechnology startup company that is helping position the research for future translation and commercialization.

Nature West’s role is to help advance the most promising extracts and research findings toward scale-up, product development, and the potential creation of nutraceutical health-promoting supplements.

“This innovative partnership paves the way for future funding and the development of next-generation nutraceuticals to improve health and quality of life.”

– Fabricio Medina-Bolivar, Ph.D.

“This collaboration represents an exciting example of how plant biotechnology, aging biology and industry partnership can come together to address important health challenges,” said Medina-Bolivar. “Our long-term goal is to identify natural compounds that can promote healthier aging and ultimately support the development of next-generation nutraceuticals.”

For Arkansas, the research represents the kind of scientific investment that builds research capacity while addressing real health challenges.

The aging of America’s population, as well as Arkansas’ population in particular, makes interventions that promote healthy aging increasingly valuable. If Medina-Bolivar and Schmid’s collaboration identifies effective botanical compounds, the knowledge could support Arkansas-based nutraceutical development and manufacturing.

The project is part of the Arkansas Research Alliance’s Impact Grant Program.



A Personal Mission:

Targeting Triple Negative Breast Cancer

Tameka Arnett Bailey, Ph.D., an assistant professor in the Arkansas State University Department of Biological Sciences, is working to understand why triple negative breast cancer is so lethal, particularly for African American women. She conducts research at the Arkansas Biosciences Institute, where her work focuses on understanding the molecular mechanisms that drive breast cancer brain metastasis.

Originally from Gould, Arkansas, Bailey attended the University of Arkansas at Pine Bluff for her undergraduate degree before pursuing her doctorate at the University of Arkansas at Fayetteville, where she was recruited by Douglas Rhoads, director of the Cell and Molecular Biology Graduate Program. After completing postdoctoral training at the University of Nebraska Medical Center, where her work was supported by a Susan G. Komen fellowship and a National Cancer Institute postdoctoral fellowship, Bailey served as a research assistant professor at the University of Arkansas before joining the faculty at Arkansas State.

Bailey's research program centers on how systemic metabolic factors influence the blood-brain barrier and promote the spread of breast cancer to the brain. She was recently awarded an Arkansas IDEa Network of Biomedical Research Excellence (INBRE) Pilot Grant to study how circulating fatty acids induce endothelial angiopoietin-like proteins that disrupt the blood-brain barrier and facilitate breast cancer brain metastasis. She also received an NIH R15 award from the National Cancer Institute to investigate how ANGPTL4 promotes triple-negative breast cancer brain metastasis through both nuclear and extracellular signaling mechanisms.

"Breast cancer remains one of the most significant health challenges affecting women in Arkansas," Bailey said. "Our state has high rates of obesity and metabolic disease, which researchers increasingly recognize as contributing factors in cancer progression. Understanding how these systemic conditions influence metastasis is essential if we want to improve outcomes."

Triple negative breast cancer, which accounts for 10 to 15 percent of all breast cancers, is defined by the absence of estrogen and progesterone receptors and low expression of human epidermal growth factor receptor 2. As a result, it does not respond to hormonal therapies or anti-HER2 treatments that work for other breast cancer subtypes. The disease is most common and most lethal in premenopausal African-American women.

"Investing in breast cancer research is critical for Arkansas," Bailey said. "By studying the intersection of metabolism and metastasis, we are addressing a problem

that is directly relevant to our population. This research has the potential to inform prevention strategies and improve survival for patients in our state and beyond."

The challenge of triple negative breast cancer is more than just its resistance to standard therapies. The disease has a propensity to metastasize to the brain, and the development of brain metastases can shorten a patient's lifespan and dramatically reduce their quality of life. Understanding the molecular mechanisms that drive this metastatic process could reveal new therapeutic targets.

In addition to her laboratory work, Bailey is deeply committed to inspiring the next generation of scientists, particularly students from underserved communities. Since 2015, she has directed the Biomedical Research Camp, returning each summer to the Arkansas Delta to introduce students to the possibilities of careers in science. The program brings fifth through seventh graders to the campus for hands-on laboratory experiences, and several students from her inaugural class have gone on to pursue higher education in STEM fields.

As she continues to build her research program, Bailey aims to develop collaborative efforts across the Arkansas Biosciences Institute and the statewide research network to advance understanding of metastatic disease and improve outcomes for patients affected by breast cancer. She is also committed to engaging and training K-12 students to foster early interest in biomedical research careers and expand the future scientific workforce.

"Our state has high rates of obesity and metabolic disease, which researchers increasingly recognize as contributing factors in cancer progression. Understanding how these systemic conditions influence metastasis is essential if we want to improve outcomes."

– Tameka Bailey, Ph.D.

Advanced X-Ray Diffractometer Acquisition Enhances Research Capabilities at Arkansas State University

Thanks to a \$595,549 grant from the National Science Foundation (NSF), Robert “Drew” Fleming, Ph.D., an assistant professor of mechanical engineering in the College of Engineering and Computer Science at Arkansas State University (A-State), is bringing one of the most advanced X-ray analysis instruments in the state to A-State. The equipment, a cutting-edge Malvern Panalytical Empyrean X-ray Diffractometer (XRD) with small-angle X-ray scattering (SAXS) capability, functions as a powerful tool for revealing the atomic-level architecture of materials.

The XRD technology uses a powerful, nondestructive technique that reveals the atomic structure of the material being analyzed. This kind of atomic-level insight opens research possibilities across virtually every scientific discipline, and the diffractometer currently supports multiple diverse research groups across campus as they tackle critical challenges in semiconductor development, solar energy efficiency, construction materials, antimicrobial drug discovery, and therapeutic protein engineering.

These projects address pressing real-world problems through innovative approaches, such as the development of III-nitride lasers for space communications, the analysis of protein structures to determine how genetic modifications affect therapeutic efficacy in pharmaceuticals, and the study of how polymer additives affect pavement durability.

“Acquisition of a modern XRD tool on campus substantially enhances our research infrastructure, enabling unique and impactful collaborations across disciplines that previously would not have been possible,” said Fleming.

It is the only XRD in Arkansas with small-angle X-ray scattering capability, giving A-State a significant competitive advantage in the region. This unique positioning helps the university attract top researchers, compete successfully for major federal grants and partner with local industries seeking to drive innovation.

Before joining A-State in 2019, Fleming spent five years as a senior research engineer at WattGlass, an Arkansas-based high-tech startup specializing in optical coatings. His experience in both industry and academia prepared

him to recognize the need for advanced analytical capabilities in Arkansas.

For Arkansas industries developing new materials, whether in advanced manufacturing, agricultural biotechnology or emerging sectors, access to XRD analysis can accelerate product development and quality control. Rather than sending samples out of state for testing, companies can now collaborate with A-State researchers who have the equipment and expertise to provide answers.

The NSF grant that funded the XRD acquisition represents a substantial federal investment in Arkansas’ research infrastructure. These Major Research Instrumentation awards are highly competitive, granted only to proposals that demonstrate both scientific merit and broader impacts, including how the equipment will be shared across institutions and used to train the next generation of scientists.

Graduate students training on this instrument gain skills that make them competitive for positions at research universities, national laboratories and industry research and development facilities nationwide. Undergraduate students exposed to cutting-edge analytical capabilities often find their career ambitions expanding, realizing they can contribute to fundamental scientific discovery right here in Arkansas.

The instrument also enables A-State to pursue other collaborations that require specialized analytical capabilities. When multi-institutional research teams form around major federal grant opportunities, institutions that can contribute unique instrumentation become essential partners rather than peripheral participants.

For Fleming and his colleagues across A-State’s research community, the XRD represents more than just a sophisticated piece of equipment. It allows researchers to ask bigger and more complex questions, while pursuing more ambitious research and establishing partnerships that would not have been feasible before.

New Researchers



Mohammadreza Daroonparvar, Ph.D.

Assistant Professor, Materials Engineering
College of Engineering and Computer Science, Arkansas State University

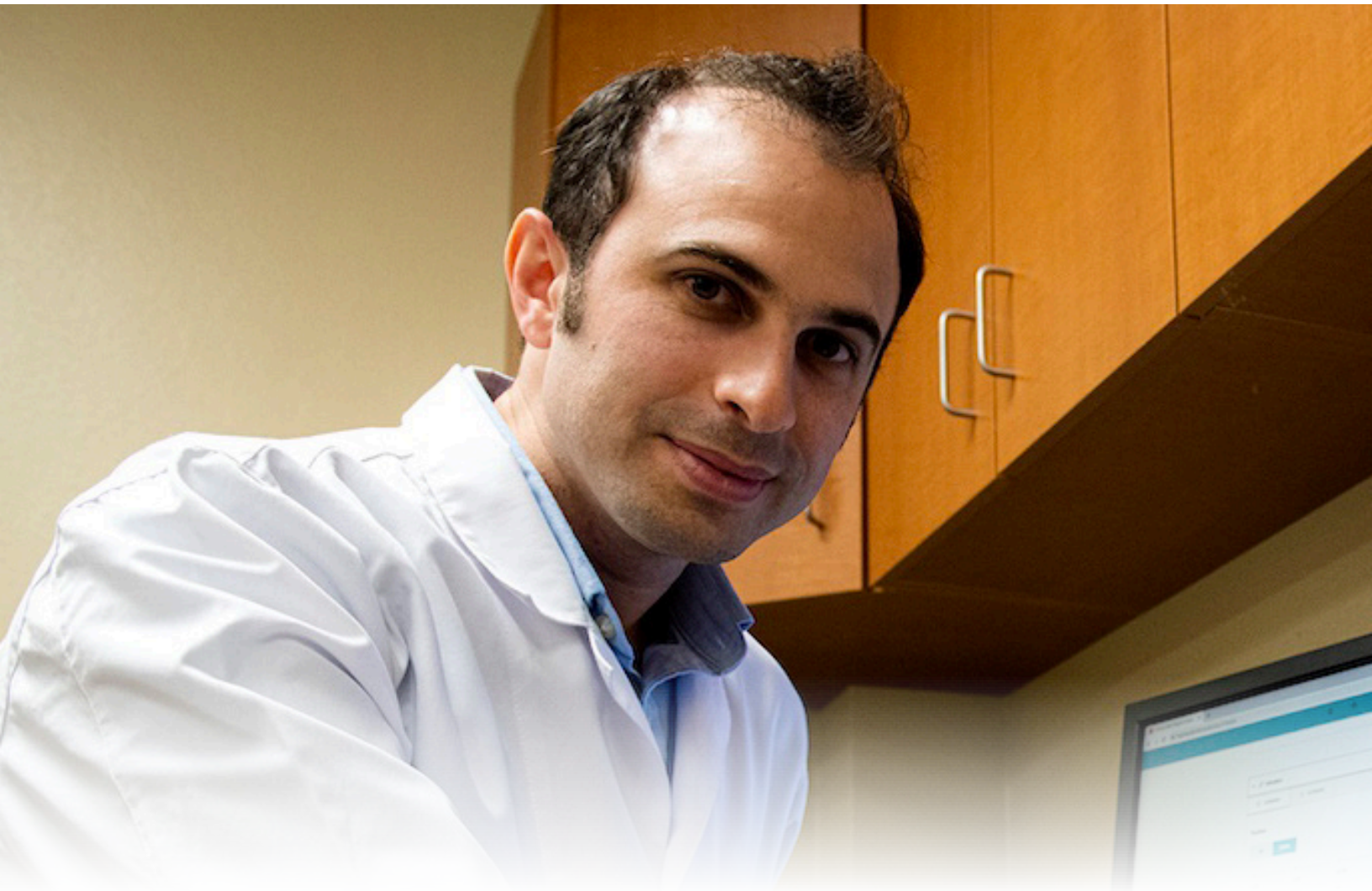
Mohammadreza Daroonparvar, Ph.D., is an assistant professor of materials engineering at Arkansas State University and is an Arkansas Research Alliance Innovation Scholar affiliated with the Arkansas Biosciences Institute. Daroonparvar's research focuses on advanced materials engineering with applications ranging from industrial manufacturing to biomedical devices, specializing in cold spray additive manufacturing, protective coatings, and surface modification of lightweight metals. His extensive work on biocompatible materials for medical implants includes developing novel coating systems to enhance corrosion resistance and bioactivity of magnesium alloys and other metals for tissue engineering applications. Daroonparvar received his doctorate from Universiti Teknologi Malaysia in 2013 and held positions at Auburn University and the University of Nevada, Reno before joining Arkansas State University. He has published more than 100 peer-reviewed journal articles, three book chapters, and four conference papers, with his work garnering more than 2,800 citations. As an Arkansas Research Alliance Innovation Scholar, Daroonparvar's work contributes to manufacturing lighter and stronger materials, advancing Arkansas' position in advanced manufacturing and materials science.



Jesse Radolinski, Ph.D.

Assistant Professor, Soil Hydrology
College of Agriculture, Arkansas State University

Jesse Radolinski, Ph.D., is an assistant professor of soil hydrology at Arkansas State University. Radolinski's research focuses on understanding how soil physics-level processes scale to watershed observations to prevent water resource degradation, with particular expertise in contaminant transport and the role of climate change on water cycling in agricultural systems. His work addresses critical questions about how shifting atmospheric conditions and climatic extremes alter water movement through soils, which has direct implications for agricultural sustainability and environmental health in Arkansas. Radolinski received his doctorate in soil hydrology from Virginia Polytechnic Institute and State University and his Bachelor of Science in environmental science from the University of Mary Washington. His research has been published in leading journals including *Science*, *Environmental Science and Technology*, and *Scientific Reports*. He recently received a prestigious Fulbright Specialist Program award to collaborate with Queensland University of Technology in Australia. Radolinski has secured funding from multiple sources including the Tyrolean Science Fund and serves as a peer reviewer for numerous scientific journals.



Ali Ubeyitogullari, Ph.D., an assistant professor in the Departments of Food Science and Biological & Agricultural Engineering at the University of Arkansas Division of Agriculture (UADA), is pioneering the use of 3D printing technology to create customized foods and pharmaceuticals. His latest breakthrough involves transforming drought-tolerant grain sorghum protein into a stable bioink that maintains its shape during printing.

Working in collaboration with Sorour Barekat, Ph.D., a postdoctoral fellow in the Department of Food Science at the University of Arkansas, Ubeyitogullari has developed the first 3D printable gel made from sorghum protein. The innovation addresses a critical challenge in the emerging field of 3D food printing while tapping into a sustainable, cost-effective protein source.

Ubeyitogullari and his team have been able to demonstrate that sorghum protein can be made into a novel 3D printable gel, which hasn't been done before. Due to their unique structure, these gels can be used

in the food and pharmaceutical industries as a bioink to encapsulate medicine or as a carrier of hydrophobic compounds and nutrients.

Sorghum, a cereal grain capable of growing in contrasting climatic conditions, is known for its health benefits, including anti-inflammatory properties and the ability to reduce heart disease risk by lowering cholesterol levels. The gluten-free grain also contains unique phenolic compounds that increase antioxidant potential.

What sets sorghum proteins apart in 3D food printing is their hydrophobicity, or ability to repel water. Many food materials are hydrophilic and readily absorb water, which limits the incorporation of hydrophobic components and can cause printed structures to lose their shape.

Building on previous work showing that sorghum flour could be made into a bioink for printing cookies, Ubeyitogullari and Barekat set out to optimize printable sorghum proteins for novel food and medicine

From Farm to Pharma: Sorghum Proteins Offer Resilient 3D Printable 'Bioink' Base

production. Their published research identified the optimal parameters for achieving the best 3D printing results.

The team found that a formulation containing 25 percent protein, printed at a speed of 20 millimeters per second with a 0.64-millimeter nozzle, yielded the most stable structures. Increasing the protein concentration to 35 percent reduced printability, indicating a performance limit.

Barekat served as lead author of the study, "Maximizing sorghum proteins printability: Optimizing gel formulation and 3D-printing parameters to develop a novel bioink," published in the *International Journal of Biological Macromolecules*. Ubeyitogullari, who is also part of the Dale Bumpers College of Agricultural, Food and Life Sciences, served as Barekat's adviser.

The potential applications go beyond food and into pharmaceuticals. The gels' ability to serve as carriers for

bioactive hydrophobic compounds presents a promising vehicle for drug encapsulation and controlled release. This dual functionality augments the versatility of 3D printing technology and sets the stage for personalized nutrition and precision medicine.

Ubeyitogullari and his team have been advancing the foundational knowledge of 3D food printing through several recent studies. In addition to the sorghum protein work, Barekat and Ubeyitogullari published a study in the *Journal of Food Engineering* investigating soy and sorghum proteins as hydrophilic and hydrophobic structures for 3D food printing.

The sorghum protein study was supported by the United Sorghum Checkoff Program, and financial support for the 3D food printing research was provided by the U.S. Department of Agriculture's National Institute of Food and Agriculture. A rheometer instrument used in the study was also acquired with support from the Arkansas Biosciences Institute.



Transforming Medication:

Using Nanotechnology to Keep Probiotics Alive to Reach the Gut

Investigators at the University of Arkansas Division of Agriculture (UADA) are developing nanotechnology-based systems that could transform how medications and probiotics reach their targets inside the human body. The latest research conducted by Jin-Woo Kim, Ph.D., a Distinguished Professor in the Department of Biological and Agricultural Engineering at the University of Arkansas, combines two organic materials to create microscopic beads that protect bioactive compounds through the digestive system.

Controlled-release systems deliver medication and other bioactive compounds to the ideal spot inside a body and over a specific time. Kim, who is also a professor of materials science and engineering in the College of Engineering, and his colleagues at the Arkansas Agricultural Experiment Station, the research arm of the UADA, have developed a new approach that could improve systems used for probiotics that boost gut health, drugs that target cancer cells and other medications for human and animal health.

The researchers combined cellulose nanocrystals derived from wood pulp and alginate from brown algae to create strong beads that encapsulate bioactive compounds. The micron-sized beads, 1/100th the size of the finest grain of beach sand, tighten in an acidic environment such as the stomach, protecting the bioactive compound from both acid and digestive enzymes. The beads swell in an alkaline environment such as the intestines, releasing the bioactive compound and then harmlessly dissolving.

The beads were created using electrohydrodynamic extrusion, which had not previously been used for a composite of cellulose nanocrystals and alginate. The electrohydrodynamic process provides more control over the size and shape of the beads, addressing two significant issues with other approaches to producing controlled-release systems.

The study, "Cellulose nanocrystal-based hydrogel microspheres prepared via electrohydrodynamic processes for controlled release of bioactive compounds," was published in *Carbohydrate Polymers*. Joseph Batta-Mpouma, founder and CEO of CelluDot, a startup headquartered at the Arkansas Research and Technology Park, served as first author, and Kim served as senior

author. Other authors included Gurshagan Kandhola, chief technology officer of CelluDot; Jaspreet Kaur, program assistant for the Department of Food Science; Kayla Foley, a postdoctoral researcher in chemical engineering; Keisha Bishop Walters, professor of chemical engineering; and Nalinikanth Kotagiri from the University of Cincinnati's James L. Winkle College of Pharmacy.

The new controlled-release system could be particularly effective at delivering probiotics to the gut, where they can aid digestion and boost the immune system. Kim received a grant from the Arkansas Research Alliance to use the system to add probiotics into animal feed, reducing the need for antibiotics and lowering farming costs.

CelluDot is Kim's industry partner on the Arkansas Research Alliance grant. The company, founded by Batta-Mpouma and Kandhola during their graduate studies, has been translating Kim's nanotechnology research into commercial applications. UADA filed for a patent on the technology and optioned intellectual property rights to CelluDot. Kim also serves as a scientific advisor to CelluDot.

Kim's work in nanotechnology has led to collaborations with the University of Arkansas for Medical Sciences on cancer detection and drug delivery, as well as agricultural applications including herbicide drift control.

Kim has spent years developing methods for turning nanoparticles into practical tools for medical, agricultural and manufacturing uses. His work in nanotechnology has led to collaborations with the University of Arkansas for Medical Sciences on cancer detection and drug delivery, as well as agricultural applications including herbicide drift control.

The technology that created the controlled-release beads represents just one application of a broader platform. The

nano-toolbox technologies and methods offer precise control over size, shape and function of nanoparticles, opening possibilities across multiple fields.

Kim has been director of the Bio/Nano Technology Group at the University of Arkansas since 2001. He was named an IEEE Fellow in 2022 for his contributions to nanoscale fabrication of bio/nano-hybrid materials, and his research has been supported by the National Science Foundation, the Arkansas Biosciences Institute and the Arkansas Research Alliance.

TraitTrainR:

New Software Package Drives Deeper Understanding of Trait Evolution

Evolution is complex and difficult to study in real time, but a new software package developed by researchers with the University of Arkansas Division of Agriculture (UADA) builds on established work in comparative biology to provide a framework for replicating the evolutionary process through large-scale computer simulations.

Rich Adams, Ph.D., an assistant professor of agricultural statistics in the Department of Entomology and Plant Pathology for the Arkansas Agricultural Experiment Station, is leading a collaborative effort to develop computational tools to help scientists unlock the evolutionary mysteries hidden in life on Earth. His latest contribution, a software package called TraitTrainR, offers researchers an efficient way to simulate how organisms change over time.

Analyzing an organism's traits and how they change over time is critically important to biological study, and the software helps scientists understand how traits have changed across millions of years and thousands of species. In most cases, multiple applications are used to analyze and perform experiments that address biodiversity, environmental science, agriculture and biomedicine. TraitTrainR streamlines this work by unifying existing approaches into a single platform capable of performing vast evolutionary experiments through probabilistic simulations.

In addition to Adams, the development team included Jenniffer Roa Lozano and Rokeya Akter, master's students in the statistics and analytics program at the University of Arkansas; and Mataya Duncan, a graduate student in the cell and molecular biology program and with the UADA Center for Agricultural Data Analytics. Their study, "TraitTrainR: accelerating large-scale simulation under models of continuous trait evolution," was published in *Bioinformatics Advances* in December 2024, with Lozano serving as lead author.

The software package could be used to address a wide range of questions, including the evolution of pathogen resistance, crop resistance and invasive species. Through extensive and well-organized simulation experiments, TraitTrainR allows researchers to generate many evolutionary scenarios for different species, which can then be compared with observed traits sampled from nature.

The package also provides a bioinformatics pipeline for users and comes with a tutorial and implementations that can be used on standard computers. Code is organized and easy to understand, and inputs and outputs can be customized to fit a researcher's desired focus.

Additional study collaborators included researchers with the University of Memphis, the University of Texas at Arlington, and Florida Atlantic University. The research was supported by the Arkansas Agricultural Experiment Station, the Arkansas High Performance Computing Center, and the Arkansas Biosciences Institute. Additional support came from the National Institutes of Health and the National Science Foundation.

In addition to the TraitTrainR study, Adams' research is centered on investigating invasive species, studying how they spread and adapt to new environments so quickly. In collaboration with colleagues at the University of Memphis, he recently sequenced the genome of the red milkweed beetle to understand how plant-eating insects evolved the ability to feed on toxic plants. These findings may help identify genetic factors that shape agricultural and forestry pests and allow them to evade control efforts.



New Researchers



Samira Feyzi, Ph.D.

Assistant Professor, Department of Food Science

Samira Feyzi, Ph.D., is an assistant professor of food science with the University of Arkansas Division of Agriculture, specializing in protein chemistry and analysis research. Feyzi's research focuses on exploring plant proteins to broaden their use in human nutrition, addressing the growing global demand for novel protein sources driven by population growth, nutritional requirements, health considerations and environmental concerns. Her work examines how various plant protein sources differ in quality and functionality, investigating soybean variety protein quality for applications ranging from alternative milk products to meat analogs, as well as analyzing off-flavor profiles to develop plant proteins with improved sensory characteristics. Feyzi received her bachelor's, master's and doctorate degrees from Ferdowsi University of Mashhad in Iran. As a visiting doctoral student at the University of Naples Federico II, she extended her research on protein interactions with aroma compounds. She completed a three-year postdoctoral fellowship at the Plant Protein Innovation Center at the University of Minnesota, where she developed expertise in analytical plant protein chemistry and modification. Feyzi conducts research for the Arkansas Agricultural Experiment Station and teaches food analysis and food chemistry courses through the Dale Bumpers College of Agricultural, Food and Life Sciences.



Emily McDermott, Ph.D.

Assistant Professor, Department of Entomology and Plant Pathology

Emily McDermott, Ph.D., is an assistant professor in the Department of Entomology and Plant Pathology at the University of Arkansas Division of Agriculture, where she specializes in medical and veterinary entomology. McDermott's research focuses on understanding the biology and ecology of arthropod pests and disease vectors that affect livestock, poultry, and wildlife in Arkansas. Her work centers on *Culicoides* biting midges, which transmit diseases such as bluetongue virus and epizootic hemorrhagic disease virus to cattle, deer, and other ruminants, as well as research on ticks that may transmit anaplasmosis to cattle. Through mapping vector locations and studying their ecologies and behaviors, McDermott develops novel control strategies to protect Arkansas' agricultural producers. She received her doctorate in medical and veterinary entomology from the University of California, Riverside, and her bachelor's degree in entomology from The Ohio State University. Before joining the University of Arkansas, McDermott worked for three years at the Walter Reed Army Institute of Research in Maryland, where she was promoted to senior scientist and received the U.S. Department of the Army Civilian Service Commendation Medal. She conducts research for the Arkansas Agricultural Experiment Station and teaches medical and veterinary entomology courses through the Dale Bumpers College of Agricultural, Food and Life Sciences.

New Researchers



Tomi Obe, Ph.D.

Center of Excellence for Poultry Science
Assistant Professor, Department of Poultry Science and
Department of Food Science

Tomi Obe, Ph.D., is an assistant professor with the Center of Excellence for Poultry Science at the University of Arkansas Division of Agriculture, with a joint appointment in the Departments of Poultry Science and Food Science at the University of Arkansas. Obe's research focuses on identifying and controlling foodborne pathogens in the poultry industry, with particular expertise in understanding Salmonella and Campylobacter persistence in poultry production and processing environments. Her work addresses a critical public health challenge, as approximately one in six human Salmonella cases in the United States is linked to poultry. Obe received her bachelor's, master's and doctorate degrees in poultry science from Mississippi State University. Her research investigates how Salmonella adapts to processing-related stresses and forms biofilms on food-contact surfaces, with the goal of developing rapid identification techniques for virulent foodborne pathogens and establishing targeted control strategies. She conducts research for the Arkansas Agricultural Experiment Station and has published extensively on multi-hurdle approaches to pathogen control. Obe's practical, industry-focused research aims to help poultry producers of all scales produce safe and wholesome products for consumers.



Don Tyson Center for Agricultural Sciences



Teaching AI to Recognize Danger: How Computer Vision Could Curb Youth Tobacco Addiction

Khoa Luu, Ph.D., an associate professor in the Department of Electrical Engineering and Computer Science at the University of Arkansas, leads a collaborative research team that has secured a National Science Foundation (NSF) grant to investigate how tobacco promotion on social media affects youth addiction. The four-year project, titled “SCH: Large Scale Multi Modality Learning System to Identify Tobacco Addiction and Predictive Analytics via Social Media Platforms,” uses artificial intelligence (AI) to identify and analyze tobacco content across digital platforms at a scale that human analysis alone couldn’t match.

The project brings together expertise spanning computer science, public health, privacy protection and economic impact assessment. Alongside Luu are Page Dobbs, Ph.D., University of Arkansas; Asad Waqar Malik, Ph.D., Mississippi State University; Samee Khan, Ph.D., Kansas State University; and Brandon McFadden, Ph.D., University of Arkansas Division of Agriculture.

Research has established strong links between social media tobacco promotion and rising use among young people, but the connection has not been studied with the kind of systematic, large-scale analysis that AI enables. Traditional research methods where humans manually code social media content cannot possibly keep pace with billions of posts, images and videos shared daily across platforms.

The research team will design AI tools capable of detecting tobacco promotion using multimodal models that analyze both visual content and text simultaneously. The team will utilize vision-language transformers, a cutting-edge architecture that allows AI to understand how images and words work together to convey meaning.

The approach prioritizes fairness, privacy and adaptability. The fairness component ensures the AI works accurately

across diverse communities. Privacy protections prevent the research from exposing individual users’ data through differential privacy and secure multi-party computation. Its adaptability allows the system to keep pace with evolving online trends and new promotional tactics.

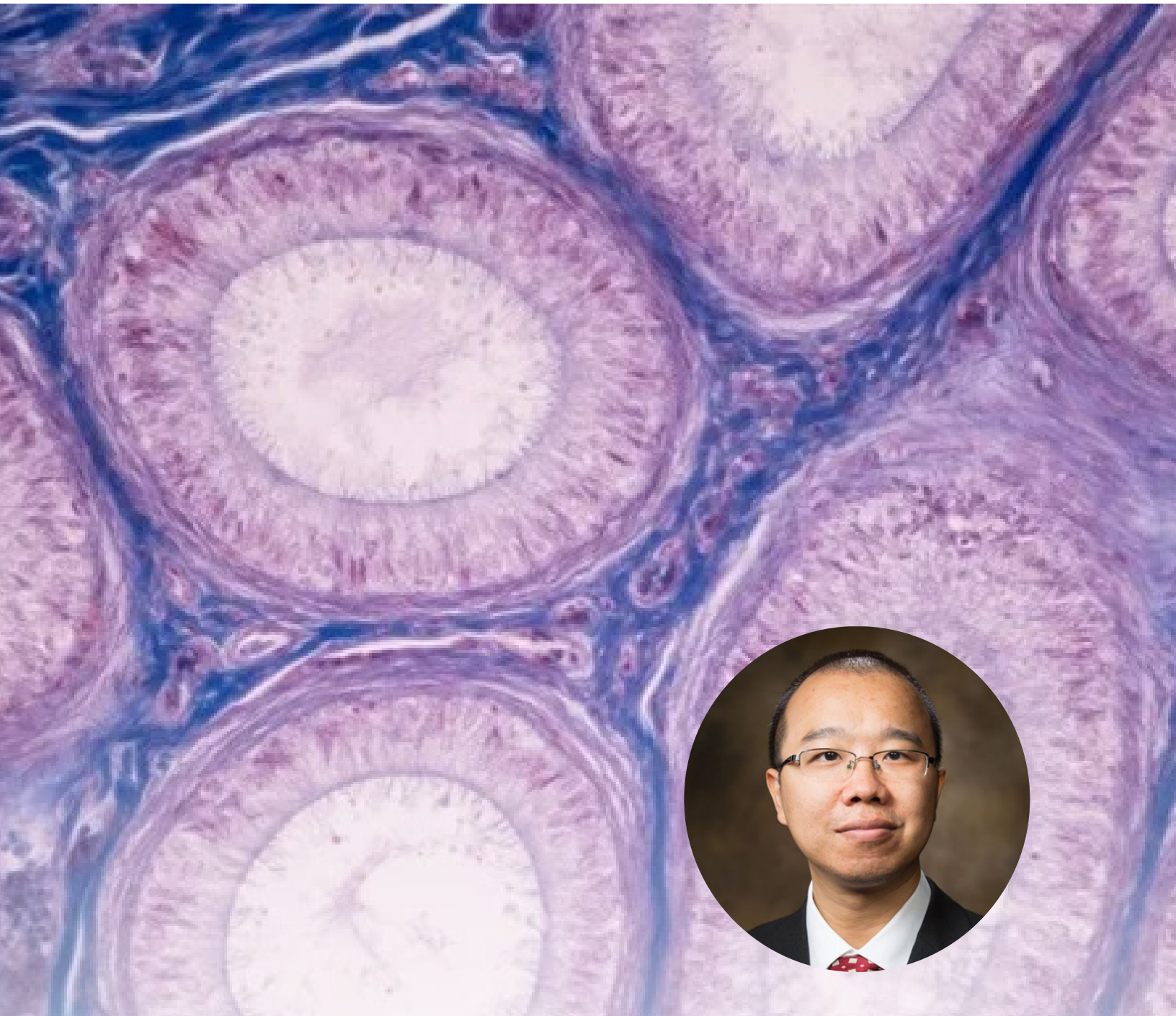
To support the work, the project will create a large-scale dataset of tobacco-related content from social media platforms, providing a resource for other investigators studying digital health threats. The project will also develop a continual learning system that adapts as social media platforms evolve, as new tobacco products emerge, and as marketers develop novel promotional strategies.

All software developed through the grant will be deployed through cloud services, making the tools accessible to researchers and public health officials who lack the computational infrastructure to build such systems themselves.

Luu founded the Computer Vision and Image Understanding Lab in 2018 after joining the University of Arkansas from Carnegie Mellon University. The lab focuses on teaching machines to see and interpret visual information, with applications in autonomous driving, precision agriculture, biometric security and health care.

Research has linked tobacco use to nearly half a million American deaths annually, and social media marketing increasingly targets youth through sophisticated digital tactics.

For the University of Arkansas, the grant represents how the institution’s investment in AI and computer vision research generates opportunities to address real-world problems. The collaboration also reflects the Arkansas Biosciences Institute’s mission to connect research across institutions and disciplines.



Molecular Switches Gone Wrong: Unlocking Cancer's Metabolic Code

Chenguang Fan, Ph.D., an associate professor in the Department of Chemistry and Biochemistry at the University of Arkansas, has received a grant from the National Institutes of Health (NIH) to investigate how a mysterious protein modification called lysine aminoacylation affects cellular metabolism and its potential role in cancer development. The research could reveal fundamental mechanisms of how cells rewire their metabolism in response to changing conditions and what goes wrong when that rewiring contributes to disease.

Inside every human cell, thousands of proteins perform the chemical choreography that keeps us alive. Lysine aminoacylation functions like adding an attachment to a tool, fundamentally changing how it works. The modification targets lysine, an amino acid that appears in most proteins and acts as a frequent site for cellular regulation.

“It’s a novel type of protein modification, and its role in human health remains largely unknown,” said Fan. “It has been found in the tumor tissues of liver cancer patients and human kidney cancer cells, indicating the potential association with cancers.”

Cancer cells rewire their metabolism, adopting patterns of energy production and nutrient utilization that differ dramatically from healthy cells. If lysine aminoacylation plays a role in that metabolic rewiring, understanding the mechanism could reveal new therapeutic targets.

Fan’s approach leverages genetic code expansion, which allows scientists to upgrade cells’ protein-making machinery to include chemical building blocks that don’t normally appear in nature. His lab has established orthogonal translation systems for four different types of aminoacylation.

“In this project, we use genetic code expansion to bypass a cell’s naturally existing modification pathway to artificially produce proteins with lysine aminoacylation, thus making investigation of the chemical process much easier,” said Fan.

Studying protein modifications as they occur naturally in cells is extraordinarily difficult because the modifications are dynamic, occurring at low levels, and regulated by complex cellular machinery.

By artificially installing lysine aminoacylation at specific sites in target proteins, Fan’s team can study the modification’s effects without the confounding variables that complicate analysis of natural cellular processes.

Fan joined the University of Arkansas in 2016 after

completing four years of postdoctoral research at Yale University in the laboratory of Dieter Söll, where he focused on genetic code expansion and noncanonical amino acid incorporation. He earned his doctorate from Iowa State University. His broader research program spans protein chemistry, bacterial pathogenesis, cancer biology and synthetic biology.

Fan’s path to this NIH-funded project runs directly through the Arkansas Integrative Metabolic Research Center, where he previously served as a research project leader investigating phosphorylation of isocitrate dehydrogenase in breast cancer.

“My experience as a research project leader with the AIMRC enabled me to refocus my research to cell metabolism, and it provided me with sufficient expertise and ample preliminary results for this project,” said Fan.

The AIMRC, founded in 2021 by Kyle Quinn, Ph.D., and now directed by Narasimhan Rajaram, Ph.D., with support from the University of Arkansas and an NIH Centers of Biomedical Research Excellence (COBRE) award, aims to build a cohort of independent metabolism researchers capable of competing for federal funding. By providing research cores and mentoring support, AIMRC helps faculty develop the expertise and data needed for competitive grant proposals.

Fan’s research goals are twofold. First, he aims to provide evidence of lysine aminoacylation’s role in regulating metabolism in human cells. Second, he plans to develop tools that his lab and other researchers can use to study this chemical modification more effectively.

The tool development component matters because lysine aminoacylation represents an emerging research frontier. Unlike well-studied modifications such as phosphorylation or acetylation, lysine aminoacylation lacks the experimental infrastructure that enables efficient investigation.

When lysine aminoacylation goes wrong, it has been linked to metabolic disorders and neurodegenerative diseases. The modification’s reversibility makes it particularly attractive as a potential therapeutic target.

For the University of Arkansas, Fan’s NIH award demonstrates how strategic investment in research infrastructure through centers like AIMRC can generate returns in federal funding and scientific impact.



What Works When Everyone's Drinking: Understanding How College Students Stay Safe

Lindsay Ham, Ph.D., a professor in the Department of Psychological Science at the University of Arkansas, is co-principal investigator on a grant from the National Institute on Alcohol Abuse and Alcoholism investigating protective behavioral strategies, the specific actions college students take to reduce alcohol-related harm in high-risk drinking contexts.

The research team, led by co-principal investigators Ham and Byron Zamboanga, Ph.D., with co-investigator Lauren Quetsch, Ph.D., will survey 500 University of Arkansas students about their drinking behaviors and protective strategies, then conduct in-depth interviews with 40 of those students to understand the reasoning behind their choices.

The concept of protective behavioral strategies recognizes that many college students will drink, sometimes heavily, despite health campaigns and university policies discouraging it. Rather than viewing harm reduction as endorsing alcohol use, researchers see it as acknowledging that if students are going to drink, understanding what keeps them safer matters.

Common protective strategies include eating before or while drinking, alternating alcoholic drinks with water, keeping track of drinks consumed, using a designated driver, and staying with trusted friends. But Ham and her colleagues want to understand more than just which strategies students use. They want to know why certain strategies feel effective or practical and why others, despite being recommended by health professionals, rarely get adopted.

Ham has spent nearly two decades studying the intersection of anxiety, alcohol use and risky behaviors among college students and emerging adults. Her research portfolio includes numerous publications examining how psychological factors influence drinking behavior, how cultural context shapes alcohol use patterns, and how anxiety and alcohol problems intertwine.

The mixed-methods approach, combining surveys with interviews, reflects Ham's understanding that numbers alone can't capture the decision-making complexity students face. Surveys can reveal which strategies are common and which outcomes they're associated with, while interviews can illuminate the social pressures, practical constraints, and risk calculations that determine whether a student actually uses those strategies when it matters most.



The study focuses on risky drinking contexts, acknowledging that not all drinking situations pose equal danger. Having two beers over dinner with friends carries different risks than playing drinking games at a crowded house party. Understanding how protective strategies function across different contexts could help health educators tailor their messages more effectively.

Ham joined the University of Arkansas in 2007 after three years at Florida International University in Miami, where she directed the Center for Anxiety and Substance Abuse. She earned her doctorate in clinical psychology from the University of Nebraska-Lincoln in 2004 and completed her predoctoral internship at the Department of Veterans Affairs and Medical University of South Carolina Consortium.

As a licensed clinical psychologist and former director of clinical training in the University of Arkansas' psychology doctoral program from 2014 to 2020, she combines research with practical understanding of how to intervene effectively with college students struggling with alcohol and anxiety issues.

The research team views this grant as a foundation for larger-scale future work. The findings could inform the development of evidence-based interventions that resonate with students' actual experiences and decision-making processes, rather than relying on approaches that ignore the social realities of college drinking culture.

The study also contributes to a broader shift in substance abuse research, moving from abstinence-only messaging toward harm reduction approaches that meet people where they are. National data consistently show that approximately two-thirds of college students drink alcohol, with significant minorities engaging in binge drinking, and alcohol-related consequences affect thousands of students annually nationwide.

Ham's research won't solve those problems overnight. But by understanding which protective strategies students actually find usable and effective, the work could guide more effective interventions that reduce harm even among students who continue drinking.

For the University of Arkansas, Ham's NIH funding represents a continuation of her long track record of federally funded research addressing one of higher education's most persistent challenges.

New Researchers



Jian Zhang, Ph.D.

Assistant Professor, Department of Biomedical Engineering
Project Leader, Arkansas Integrative Metabolic Research Center

Jian Zhang, Ph.D., is an assistant professor in the Department of Biomedical Engineering at the University of Arkansas and is a research project leader with the Arkansas Integrative Metabolic Research Center. Zhang's research focuses on understanding the mechanobiology of cancer, specifically how physical forces and cellular metabolism interact to drive cancer invasion and metastasis. His work examines how cancer cells adapt their bioenergetics during collective migration, investigating how tumor cell clustering provides metabolic advantages that make cell clusters more invasive and metastatic than individual cells. Through engineering tissue culture platforms and advanced imaging techniques, Zhang studies how physical cues such as tissue stiffness affect cancer cell behavior and energy generation. He received his bachelor's degree in theoretical and applied mechanics from Peking University in China and his doctorate in biomedical engineering from Carnegie Mellon University. Before joining the University of Arkansas in 2022, Zhang completed postdoctoral training in the Department of Biomedical Engineering at Vanderbilt University. In 2023, he received the National Institutes of Health Trailblazer Award, and in 2025, he was awarded \$1.82 million from NIH to develop quantitative tools to study how physical forces impact cell and tissue behavior in cancer progression. Zhang's interdisciplinary research integrates computational modeling, genetic biosensors, and tissue-engineered platforms to advance understanding of cancer mechanobiology and develop new therapeutic approaches.





Building a Molecular Foundation

When cancer researchers want to understand why tumors develop, resist treatment or return after apparent cure, they increasingly look beyond tissues and cells to investigate how individual molecules interact to trigger cascades of cellular consequences.

At UAMS, a research center dedicated to investigating these molecular interactions is advancing cancer research while building the junior faculty research base. The Center for Molecular Interactions in Cancer (CMIC), established in 2024 with an \$11.48 million grant from the National Institutes of Health (NIH), combines cutting-edge technology with systematic faculty development. Robert Eoff, Ph.D., professor in the Department of Biochemistry and Molecular Biology, directs the CMIC.

Researchers with the CMIC are essentially digging down beneath the level of the body's organs to study the components of the cell—the molecules and even the atoms within them—to understand what makes a cancer cell cancerous.

The scientific focus of the CMIC targets a fundamental question: how do molecular-level interactions between proteins, DNA, RNA and other biomolecules drive cancer's initiation, progression and resistance to therapy? Answering that question requires technology capable of visualizing molecules in three dimensions, measuring how quickly they bind and separate, and tracking their movements at timescales measured in nanoseconds.

To enable such work, the center established two highly specialized research cores. The Structural Biology Core, led by Eric Enemark, Ph.D., associate professor in the Department of Biochemistry and Molecular Biology at UAMS, provides researchers access to cryogenic electron microscopy (cryo-EM), technology that uses high-speed electrons to capture molecular structures at near-atomic resolution.

In the past, researchers were limited in the types of molecules they could investigate, but recent advances, especially in cryo-EM, enable the study of a wider array of molecules.

The Biomolecular Interactions Core, directed by Kevin Raney, Ph.D., chair of the Department of Biochemistry and Molecular Biology at UAMS, provides quantitative analysis

of how macromolecules interact, measuring binding affinities, reaction rates and molecular dynamics down to the level of single molecules.

Beyond providing advanced research infrastructure, the CMIC addresses a critical need for developing the next generation of cancer researchers. The CMIC currently supports up to five research project leaders, junior investigators who receive multi-year funding, structured mentorship from senior faculty and access to core facilities while developing the preliminary data and track record needed to compete for independent R01 grants from NIH.

"It is exciting to bring these researchers together so they can find community and generate new ideas with other talented people doing cutting-edge science," Eoff said.

The CMIC's research portfolio reflects diverse approaches to understanding cancer at molecular scales. Eoff's own laboratory investigates how cancer cells tolerate DNA damage during replication, research with implications for understanding treatment resistance and developing new therapeutic strategies.

Other investigators study protein modifications that transform normal cells into malignant ones, examine how metabolic reprogramming drives tumor growth and investigate molecular mechanisms of DNA repair that tumors exploit to survive chemotherapy.

The CMIC operates under a five-year Phase 1 Centers of Biomedical Research Excellence (COBRE) award and joins UAMS' portfolio of COBRE-funded research excellence centers, demonstrating the institution's capacity to build and sustain federally funded research infrastructure.

In laboratories throughout the UAMS campus, researchers supported by the CMIC are examining how molecules interact to drive malignancy, using cryo-EM to visualize protein structures, measuring molecular binding kinetics and investigating how cancer cells exploit normal cellular machinery for malignant purposes. The discoveries emerging from this work will expand scientific understanding of cancer biology while simultaneously advancing UAMS' cancer research capabilities.



Studying Emerging Infectious Threats: The Center for Animal Models of Infection and Disease

When the COVID-19 pandemic exposed critical gaps in America's infectious disease research infrastructure, the University of Arkansas for Medical Sciences (UAMS) recognized an opportunity to expand its capabilities. UAMS' existing Biosafety Level-3 facility, while valuable for studying pathogens such as tuberculosis, plague and Q fever, lacked the space and modern equipment needed to respond quickly to emerging threats or accommodate collaborative research requests from institutions nationwide.

In October 2022, the National Institutes of Health (NIH) awarded UAMS \$7.9 million to address that limitation. Daniel Voth, Ph.D., vice chancellor for research and innovation at UAMS, serves as the principal investigator.

The renovation project is responsible for the creation of the Center for Animal Models of Infection and Disease (CAMID) as well as nearly 10,000 square feet of redesigned research space in Biomedical Research Center Building One that will position Arkansas as a regional leader in pathogen research.

UAMS has been able to conduct some collaborative research on COVID-19; however, researchers were often limited due to the lack of space. By repurposing an atrium, converting large diagonal hallways into usable space and transforming offices into laboratories, the project creates approximately 9,900 square feet of additional research capacity without constructing new buildings, providing a cost-effective approach that maximizes federal and state investment.

Biosafety Level-3 (BSL-3) facilities represent specialized research infrastructure designed to protect both researchers and the broader community when working with infectious agents that can cause serious or potentially lethal disease through respiratory transmission.

Operating a BSL-3 lab requires sophisticated engineering controls, including specialized ventilation systems that create negative air pressure to prevent pathogens from escaping, airlocks that prevent contamination during entry and exit, and decontamination systems for all materials and waste leaving the facility.

Animal models remain essential for infectious disease research despite advances in cell culture and computational modeling. Many pathogens cause complex, systemic infections that can't be adequately studied in test tubes.

Understanding how infections progress through different organ systems, how immune responses develop over time and whether experimental treatments work in living

organisms requires animal research conducted under the most rigorous safety and ethical standards.

CAMID will expand UAMS' capacity to study a broader range of pathogens while maintaining the highest biosafety standards. Current research programs investigate tuberculosis, still a leading infectious disease killer globally despite being largely controlled in the United States, as well as plague, COVID-19 and Q fever. The expanded facility will accommodate new pathogen studies while enabling UAMS to respond rapidly to emerging infectious threats.

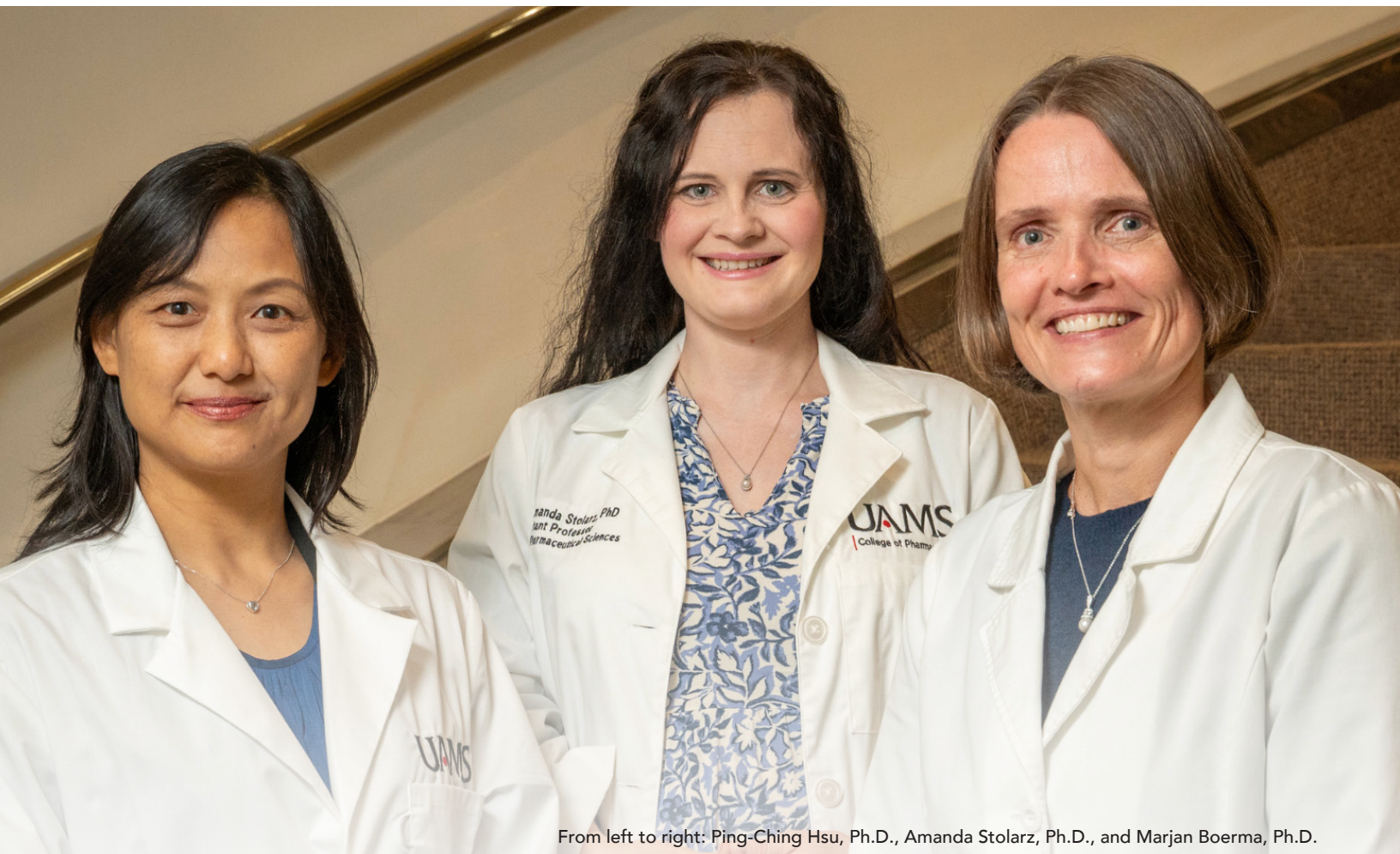
The renovation project also establishes a Pandemic Response and Public Health Laboratory, recognizing that infectious disease research infrastructure serves more than one purpose. During routine operations, the facility supports basic and translational research investigating pathogen mechanisms, host immune responses and experimental therapeutics. During pandemics or other public health emergencies, the same infrastructure can pivot rapidly to support urgent response research, diagnostic development and therapeutic testing.

COVID-19 demonstrated both the value of existing BSL-3 capacity and the limitations imposed by insufficient space. UAMS researchers contributed to pandemic response efforts but had to decline numerous collaborative opportunities because the existing facility couldn't accommodate additional work. The expanded center ensures Arkansas won't face similar constraints during future outbreaks.

UAMS maintains accreditation from the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC), the gold standard for laboratory animal programs.

For Arkansas researchers, the expanded center offers new opportunities to compete for federal grants requiring BSL-3 capabilities, to establish collaborations with institutions seeking partners with appropriate facilities and to train the next generation of infectious disease researchers in state-of-the-art environments.

The research community in Arkansas will possess infectious disease research infrastructure that positions the state to contribute substantively to national pandemic preparedness, to compete effectively for federal research funding and to respond rapidly when the next novel pathogen emerges.



From left to right: Ping-Ching Hsu, Ph.D., Amanda Stolarz, Ph.D., and Marjan Boerma, Ph.D.

Building Research Careers and Battling Cancer Treatment Side Effects:

The Center for Studies of Host Response to Cancer Therapy

Marjan Boerma, Ph.D., a professor in the Department of Radiation Health at the University of Arkansas for Medical Sciences (UAMS) and associate director of basic science at the UAMS Winthrop P. Rockefeller Cancer Institute, has spent 20 years investigating how radiation and chemotherapy damage healthy tissues while attacking tumors. Now, with nearly \$5.8 million in new funding from the National Institutes of Health (NIH), she is leading a research center uniquely positioned to make cancer therapy safer for patients across Arkansas and beyond.

The NIH grant, awarded in September 2025, funds Phase 3 of the UAMS Center for Studies of Host Response to Cancer Therapy, a Centers of Biomedical Research Excellence (COBRE) initiative that Boerma has directed since 2020. The award brings total federal investment in the center to more than \$27 million since its 2015 establishment, making it the first COBRE in the United States dedicated exclusively to understanding and preventing cancer treatment side effects.

“Most cancer patients experience side effects from their treatment, sometimes mild, sometimes severe,” said Boerma, who holds the J. Thomas May Distinguished Endowed Chair in Oncology. “If we can predict who will develop those side effects, or develop strategies to reduce them, we can make therapies safer, increase patients’ quality of life and even allow doctors to safely deliver higher doses when needed.”

The COBRE model serves two purposes. First, it funds research into cancer therapy toxicities such as cardiac damage from radiation, lymphedema following chemotherapy and neurotoxicity from various treatments. Second, and equally important, it functions as a faculty development engine, providing structured mentorship and research support that transforms assistant professors into independently funded investigators.

The Center currently supports junior and mid-career faculty through two mechanisms: Project Leader positions that provide sustained multiyear support and Pilot Project Awards offering up to \$75,000 for one year to test novel hypotheses. Both programs include mentorship from senior faculty, access to specialized core facilities and strategic guidance on grant writing and career development.

Among the current project leaders are Amanda Stolarz, Ph.D., assistant professor in the UAMS College of Pharmacy, who studies chemotherapy-induced lymphedema, and Ping-Ching Hsu, Ph.D., associate professor in the UAMS Fay W. Boozman College of Public Health, who investigates cardiac side effects of chemotherapy. Their collaboration demonstrates the Center’s interdisciplinary approach, combining preclinical laboratory models with real-world data from Arkansas cancer patients.

“By combining our expertise, we can better understand how cancer treatments affect patients’ hearts and lymphatic systems at the same time,” Stolarz said. “That’s important because these side effects don’t happen in isolation.”

This interdisciplinary framework breaks down traditional departmental silos to unite chemists, biologists, clinicians and other specialists. The approach has produced innovative research directions and helped establish specialized research infrastructure, including the Radiation Biology Shared Resource that now operates within the Cancer Institute.

Boerma has co-authored more than 140 scientific articles examining how ionizing radiation damages cardiovascular tissue, how to predict which patients face highest risk

and what interventions might prevent or treat radiation injury. Additionally, her work aims to address accidental radiation exposure risks and cardiovascular dangers astronauts face from space radiation during long-duration missions.

With the new Phase 3 funding, Boerma plans to expand the Center’s research portfolio into immunotherapy, cancer treatments that harness the immune system to attack tumors but can trigger severe side effects in some patients. As immunotherapy increasingly replaces or supplements traditional chemotherapy and radiation, understanding and mitigating its toxicities becomes urgent.

Boerma’s goal has been to establish a highly productive research center capable of making impactful discoveries while providing a foundation for the careers of numerous junior faculty and support for critical core resources that drive cancer-related research.

As cancer survival rates continue improving, the quality of that survival becomes increasingly important. The Center attacks this problem systematically, investigating the molecular mechanisms behind treatment toxicities, identifying patients at highest risk and developing interventions to prevent or reduce damage.

The work combines fundamental biological discovery with practical clinical application, positioning UAMS as a national leader in a field that grows more critical as cancer treatment improves.

As cancer survival rates continue improving, the quality of that survival becomes increasingly important. The Center’s work combines fundamental biological discovery with practical clinical application, positioning UAMS as a national leader in a field that grows more critical as cancer treatment improves.

APPENDIX 1: ABI-SUPPORTED RESEARCH FOR 2025

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
ARKANSAS CHILDREN'S RESEARCH INSTITUTE									
Utilizing Telemedicine to Improve Monitoring and Follow-up for Children on Chronic Invasive Home Ventilator – Pilot Study to Look for Feasibility, and Impact on Health Care Resource Utilization	A. Agarwal			\$972	0.52	PCORI			University of Massachusetts Medical School
Healthcare Transition: Lived Experience of Females with Congenital Heart Disease and Impact of Lapse of Care on Their Quality of Life and Perceived Health Status	D. Armikarina		0.01			N/A	5		
Generation of Placental Proteomics Data on the Growing Cohort and Integration with Comprehensive Metadata and Placental Multi-omics Data	A. Andres			\$405,915	1.42	NIH			
		805,559.00	3.00						
STReNGth & Outpatient Exercise Regimen in ALL-A Feasibility Study	L. Appell	285,365.00	0.97			N/A	5	1 UAMS	
Pediatric Obesity Research	E. Borsheim			\$22,500	0.32	Arkansas Children's Hospital Foundation	4,5	2 UAMS	
				\$24,750	0.10	USDA	4,5	3 UAMS	Texas A&M University
				\$25,311	0.15	USDA	4,5	4 UAMS	NC State
Investigating the use of DNA-PK(cs) Inhibitors as Immunosuppression Therapy for Organ Transplants	M. Burdine			\$176,458	0.51	NIH	5	5 UAMS	
Pediatric Pulmonary Research	J. Carroll			\$16,277	0.12	NIH	5	6 UAMS	Boise State University
Effect of lactate on myoglobin oxygenation and deoxygenation - A novel study in understanding energy deficit in failing heart conditions	S. Chintapalli			\$31,456	0.22	NIH			University of Kansas Medical Center
Vascular Anomaly Collaborative Research Program	S. Crary			\$4,677	0.70	CDC			Univ. of Texas
				\$15,592	0.70	CDC			Univ. of Texas
				\$10,183	N/A	Agios			PPD
				\$4,875	N/A	Novartis			Baylor
				\$90	N/A	ATHN			
				\$19,472	N/A	ASC Therapeutics			Labcorp
				\$11,001	N/A	Baxalta			IQVIA RDS Inc

APPENDIX 1: ABI-SUPPORTED RESEARCH FOR 2025

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
				\$625	N/A	NIH			Univ. of Texas
				\$20,385	0.12	HRSA			The Univ. of Texas Health Science Center at Houston
				\$1,853	0.10	HRSA			The Univ. of Texas Health Science Center at Houston
Population Health Research	P. Darden			\$4,565	N/A	NIH	5	7 UAMS	
				\$9,129	N/A	NIH	5	8 UAMS	
Novel Echocardiographic Markers of Pulmonary Vascular Disease in Infants	S. Diamond		0.04			N/A	5	9 UAMS	
Exploring the Efficacy of Isometric Exercise in Pediatric High Blood Pressure Management [BEE-Power Study (Boosting Exercise for Excellent Pediatric Blood Pressure)]	E. Diaz Fuentes		0.68	\$413,077	1.55	Cargill	4, 5	10 UAMS	
Evaluating the Impact of Allergen Elimination Diets on the Nutritional Status of Food-Allergic Children	D. Doan		0.01			N/A	5	11 UAMS	
Neuroimaging of Food-Related Impulse Control and Stressors in Childhood Obesity	D. Escalona-Vargas		0.01			N/A	4, 5	12 UAMS	
Integrative Genomics in Pediatric AML	J. Farrar			\$1,394	N/A	Novartis	5	13 UAMS	Amicus Therapeutics, Inc.
				\$231,000	1.00	DOD	5	14 UAMS	
Pediatric Nutrition and Obesity Research	M. Ferruzzi		1.16	\$33,407	0.65	NIH	4, 5	15 UAMS	Mount Sinai
Academic Achievement After Critical Illness	C. Foster	12,457.00	0.20			N/A	5	16 UAMS	
Compassion Satisfaction and Compassion Fatigue of Burn Team Members over Time	C. Grauer		0.02			N/A	5		
Prevention of Adolescent Obesity-Associated Liver Steatosis via Metformin-Induced Alteration in the Gut Microbiota	R. Hakkak				0.35	USDA	4,5	17 UAMS	
Biomarkers of Acetaminophen Toxicity	L. James			\$1,255		GlaxoSmithKline	5	18 UAMS	
Glycemic Patterns During Gestation: CGM as a Proxy Measure of the Intrauterine Environment	L. Jansen			\$176,812	3.00	NIH	5	19 UAMS	

APPENDIX 1: ABI-SUPPORTED RESEARCH FOR 2025

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
Impact of MyChart Information Auto-Release on Clinical Staff, Patient, and Family Interactions in a Children's Hospital System	D. Janssen		0.02			N/A	5		
Assessing Risk, Outcomes, and Disparities in Pediatric Asthma	A. Jefferson		0.21	\$149,503	0.98	NIH	5	20 UAMS	
Food Allergy Research	S. Jones			\$5,322	N/A	DBV	5	21 UAMS	PRA INTL
				\$15,656	N/A	Regeneron	5	22 UAMS	Icon
				\$4,263	0.11	NIH	5	23 UAMS	Moonlight Therapeutics
				\$15,855	N/A	NIH	5	24 UAMS	BRI
				\$97,214	N/A	Syneos	5	25 UAMS	
				\$368	N/A	DBV	5	26 UAMS	
				\$226,665	1.20	NIH/NIAID	5	27 UAMS	
				\$296,871	4.73	NIH/NIAID	5	28 UAMS	Johns Hopkins
				\$1,300	N/A	Genentech	5	29 UAMS	Johns Hopkins
				\$226,292	1.69	NIH	5	30 UAMS	Johns Hopkins
Omics Approaches to Define Antifungal Drug Response and Resistance in Aspergillus fumigatus	P. Juvvadi			\$521,377	1.96	NIH	5	31 UAMS	
				\$251,107	0.55	NIH	5	32 UAMS	
Pediatric Nutrition Research	C. Kay	273,788.00	0.01	\$211,676	0.63	NIH	4,5	33 UAMS	UNC-CH
				\$18,526	0.30	NIH	4,5	34 UAMS	RTI Health Solutions
Pediatric Infectious Disease Research Program	M. Kelly	2,058,909.00	0.94	\$57,523	0.15	American Lung Association	5	35 UAMS	
				\$23,938	0.01	NIH	5	36 UAMS	
				\$66,308	0.68	NIH	5	37 UAMS	Cornell University
Enhancing SARS-CoV-2 Sequencing Efforts for Variants in the State of Arkansas	J. Kennedy		0.15	\$76,499	N/A	NIH			UCSD
				\$98,962	0.62	NIH			RAFT Pharmaceuticals
				\$839,783	3.25	NIH			
				\$55,417	0.82	Merck			University of Colorado Denver - Anschutz Medical Center
Pediatric Pharmacological and Toxicological Research	E. Liebelt		0.11	\$404		American College of Medical Toxicology, Inc.	5	38 UAMS	
Pupillometry Changes to Detect Pain and Analgesic Response in Vaso-Occlusive Pediatric Sickle Cell Disease Patients.	J. Mack			\$17,118	N/A	Genentech	5	39 UAMS	
Pediatric Critical Care Research	P. Mourani	89,719.25	0.05	\$15,830	0.10	NIH	5	40 UAMS	UCSF

APPENDIX 1: ABI-SUPPORTED RESEARCH FOR 2025

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
				\$14,819	0.08	NIH	5	41 UAMS	University of Utah
				\$524	N/A	NIH	5	42 UAMS	University of Utah
				\$486	N/A	NIH	5	43 UAMS	University of Utah
				\$222	N/A	NIH	5	44 UAMS	University of Utah
				\$11,268	0.03	NIH	5	45 UAMS	CHOP
				\$95,518	0.77	NIH	5	46 UAMS	UCSF
Effects of C-section delivery on offspring brain development	X. Ou			\$2,347,373	12.50	NIH	5	47 UAMS	
				\$49,349	1.00	NIH	5	48 UAMS	UCSD
				\$412,126	2.90	NIH	5	49 UAMS	
Telehealth Enhanced Asthma Management (TEAM)	T. Perry		0.86	\$7,245	0.02	NIH	5	50 UAMS	Rochester
				\$350,625	1.68	NIH	5	51 UAMS	
				\$4,565	N/A	NIH	5	52 UAMS	
				\$9,129	N/A	NIH	5	53 UAMS	
Comparison between Telemedicine and In-Home Assessments for Identification and Reduction of Asthma Trigger	R. Pesek			\$15,785	0.03	NIH/NIAID	5	54 UAMS	Cincinnati Children's Hospital
Rodent Metabolic and Behavioral Phenotyping Core (RMBPC)	C. Porter		0.16	\$314,232		NIH	5	55 UAMS	
		772,419.00	0.60	\$426,250	1.66	NIH	5	56 UAMS	
Enhancing Child Sleep Health Assessment: Evaluating the Accuracy of the Children's Sleep Health Questionnaire (CSHQ) Across Developmental Stages	J. Rivera	29,866.00	0.45			N/A	5	57 UAMS	
La CASA Program: Comunidad Alimentacion, Salud & Amen	M. Rojo	173,19	0.13			N/A	5	58 UAMS	
Pediatric Cancer Research	S. Roy Choudhury			\$15,380	0.10	NIH	5	59 UAMS	University of New Mexico
				\$34,356	0.20	US Department of Veterans Affairs	5	60 UAMS	Univ. of Missouri
				\$269,500	1.24	NIH	5	61 UAMS	
				\$51,333	0.27	DOD	5	63 UAMS	
Metabolic and Immunologic Networks in Peanut Allergy	A. Scurlock			\$5,958	N/A	Aimmune	5	64 UAMS	IQVIA RDS Inc
				\$50,001	N/A	FARE	5	65 UAMS	
				\$6,090	N/A	Siolta	5	66 UAMS	Paidion
Beyond Race: Objectively Assessed Skin Color and its Association with Pulse Oximeter Bias in Critically Ill Infants	M. Sharma		0.90	\$21,859	N/A	Oak Hill	5	67 UAMS	PPD

APPENDIX 1: ABI-SUPPORTED RESEARCH FOR 2025

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
				\$12,180	0.14	Paul Henson Foundation	5	68 UAMS	Children's Mercy Hospital
Growth Restriction and its Effects on Organ Maturation Trends Using Magnetoencephalography (KL2)	A. Shukla		0.47			N/A	5	69 UAMS	
Markers of Pulmonary Hypertension Associated with Bronchopulmonary Dysplasia in Extremely Low Gestational Age Infants	R. Siddaiah	1,628,755.00				N/A	5	70 UAMS	
Pediatric Infectious Disease Research	W. Steinbach			\$32,500	0.36	Advances Against Aspergillosis Ltd	5	71 UAMS	
				\$557,124	0.61	NIH	5	72 UAMS	
				\$1,384,052	0.85	NIH	5	73 UAMS	
PlexinA2 Forward Signaling in Persistent Pain	K. Stephens			\$269,500	1.50	NIH	5	74 UAMS	
Identification of MicroRNA Networks Driving Vascular Malformation Growth	G. Strub			\$684,713	2.10	NIH	5	75 UAMS	
Systems Mass Spectrometry Pilot Program	A. Tackett	150,00		\$1,764,000	1.75	NIH	5	76 UAMS	
Establishing Translational Data to Improve Dietary Strategies for Critically Ill Patients	G. ten Have	291,942.00	0.20			N/A	5	77 UAMS	
Pediatric Critical Care Research	B. Varisco		2.80			N/A	5	78 UAMS	
Correlation Between Motivation, Success, and Grit During Return to Sport After ACL Reconstruction	C. Walker	5,00	0.15			N/A	5		
Parental programming of offspring physiology and metabolism	U. Wankhade			\$6,900	0.35	USDA	4, 5	79 UAMS	Univ. of Utah
				\$232,176	0.90	NIH	4, 5	80 UAMS	
Center for Childhood Obesity Prevention	J. Weber	3,245.00		\$7,681		NIH	4, 5	81 UAMS	
				\$227,333	1.04	NIGMS	4, 5	82 UAMS	
				\$255,440	0.25	NIGMS	4, 5	83 UAMS	
				\$333,984	1.15	NIGMS	4, 5	84 UAMS	
				\$1,147,319	3.88	NIGMS	4, 5	85 UAMS	
Total for ACRI		\$ 6,580,214	14.30	\$ 16,385,699	66.65				

APPENDIX 1: ABI-SUPPORTED RESEARCH FOR 2025

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
ARKANSAS STATE UNIVERSITY									
Synthesis and Antimelanoma Studies of Chimeric Thiazolo-Ethisterone Derivatives Amendment 2 Year 3	Alam, Mohammad Abrar			\$136,935		NIH, AR INBRE	2	86 UAMS	
Alzheimer's Gut Microbiome Project FY25	Bhattacharyya, Sudeepa			\$14,688	0.04	NIH, Duke University	2		Subaward from Duke University
How Does Forest Management Affect Cerulean Warbler Breeding Ecology and Demographic Rates in Mixed-Oak Forests of the Ozark Ecoregion?	Boves, Than			\$40,740		US Dept. of the Interior	5		US Fish and Wildlife Service; AR Game and Fish Commission
Startup Funding - Animal Science/ Health	Burnett, Randy (Hunter)	\$11,898					1		
Women and Minorities in STEM Fields Program: Arkansas Community Statewide Partnerships and AGRI-STEM Pathways for Underrepresented Students	Crutchfield, Nina			\$5,497		USDA	1,5		Univ of AR System Division of Agriculture
Creating a New Pathway for Increasing the Presence of African American Teachers in FANH Teacher Education Programs	Crutchfield, Nina			\$37,627		USDA-NIFA	1,5		
MRI Track 1: Acquisition of an X-Ray Diffractometer to Enhance Materials and Biomaterials Research and Education at Arkansas State University	Fleming, Robert (Drew) (PI), Jay X (Co-PI), Abrar A (Co-PI), Zahid H (Co-PI)			\$204,804	0.08	NSF	5		Division of Civil, Mechanical and Manufacturing Innovation (CMMI)
Nitride Ultraviolet Laser Diodes for Harsh Environments, Space Based Communications and Remote Sensing	Fleming, Robert (Drew)			\$86,000	0.50	NASA	5		AR EPSCor/ UALR
CC* Strategy: Campus - Cyberinfrastructure Modernization at Arkansas State University	Fleming, Robert (Drew), Jonathan S (Co-PI), Alexandr S (Co-PI), Sudeepa B (Co-PI)			\$99,906		NSF	5		CISE/OAC
Low Friction and Durable Graphite Coatings for Reducing Energy Consumption in Conveyor Systems	Fleming, Robert (Drew)			\$41,003	1.00	NSF	5	87 UAF	
SURF_Kiefer Scott: Computational Modeling of Dislocation Dynamics in Core-Shell Nanostructures	Fleming, Robert (Drew)			\$2,750		ADE DHE	5		

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Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
SURF_Landon Rogers: Nanomechanical Characterization of Enzymatically-Degraded Low-Density Polyethylene	Fleming, Robert (Drew)			\$2,750		ADE DHE	5		
Phylogenomic evaluation of species boundaries within the <i>Notropis rubellus</i> species complex, with special emphasis on the Ouachita Highland population	Fluker, Brook; Sweet, Andrew			\$39,222		US Dept. of Interior	5		AGFC, USFWS
Endangered Red Wolf Project	Gustafson, Kyle	\$4,367	0.25				5		
Wyoming Mountain Lion Genetic Analysis	Gustafson, Kyle			\$45,000		US Dept of the Interior	5		US Fish and Wildlife Service
BRC-BIO: Uncoiling the Ecological and Evolutionary Drivers of Snail-Symbiont Interrelationships	Gustafson, Kyle			\$150,811		NSF	5		UALR, AR Space Grant Consortium
Wood Frog (<i>Lithobates sylvaticus</i>) Mass Mortality Events in Arkansas: Pathogens, Parasites, and Genetics	Gustafson, Kyle			\$34,192		US Fish and Wildlife Service	5		AR Game and Fish Commission
Utilization of Steel Industry Slag for Producing Durable Concrete	Hossain, Zahid			\$102,212		AR Dept of Transportation	5		
Expression of AtGNL in <i>Camelina sativa</i> to Improve Seed Yield and Heat Tolerance	Lorence, Argelia	\$34,997	0.75				2		
DSFAS: Machine Learning Integration of Multitemporal Imagery and Genomics to Accelerate Development of Climate-Smart Rice	Lorence, Argelia			\$148,988	0.10	USDA - NIFA	1,2		
NRT-URoL: UandI-DEECODE: Understanding Invasion and Disease Ecology and Evolution through Computational Data Education	Marsico, Travis; Qualls, Jake; Bellis, Emily; Wijeratne, Asela; Gustafson, Kyle			\$499,871	0.25	NSF	1,5	88,89 UAF, UAMS	Arkansas EPSCoR; USDA Forest Service, Southern Research Station; Memphis Zoo; Kenyatta University, Kenya; University of Nebraska-Lincoln; Cary Institute of Ecosystem Studies; Lincoln University, Canterbury, New Zealand; BASF
Estimating invasive plant propagule pressure and modeled establishment risk to southern agroforestry.	Marsico, Travis			\$38,755	0.60	USFS	5		Customs & Border Protection; Georgia Ports Authority; Georgia Forestry Commission

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Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
Preventing Landscape-Level Invasion By Understanding Sources Of Nonnative Weed Species Hitchhiking Via Global Trade Routes: A Focus On The Panama Canal Region	Marsico, Travis			\$149,465	0.50	USDA, USFS	5		US Forest Service, Avalo, Inc., Smithsonian Tropical Research Institute
Quantifying Agronomic Benefits of Soil Amendments in Irrigated Crops	Marsico, Travis			\$110,000		Grantham Foundation for the Protection of the Environment	1		ASU System Foundation
RII Track-1: Data Analytics that are Robust and Trusted (DART): From Smart Curation to Socially Aware Decision Making Year 5	Marsico, Travis			\$45,685	0.25	National Science Foundation	2,5		AR Economic Development Commission
ASU Undergraduate Research Assistant Fellowship Program for EPSCoR DART Project YR 5 FY 25	Marsico, Travis			\$26,900	3.00	National Science Foundation EPSCoR	2,5		AR Economic Development Commission
ASU Graduate Research Assistant Fellowship Program for EPSCoR DART Project YR 5 FY 25	Marsico, Travis			\$73,652	0.75	National Science Foundation EPSCoR	2,5		AR Economic Development Commission
Preserving Water Quantity and Quality for Agriculture in the Lower Mississippi River Basin Amendment 06	Marsico, Travis			\$33,000	2.50	USDA - ARS	1		
RSA 58-6024-4-008 Acquisition of Goods and Services Amendment 01	Marsico, Travis			\$51,792		USDA - ARS	1		
RSA 58-6024-4-015 Acquisition of Goods and Services	Marsico, Travis			\$52,430		USDA - ARS	1		
Revamping Agricultural Biotechnology Education in Puerto Rico by Empowering K-14 Teachers	Arun A (PI), Joshee N (Collaborator), Medina-Bolivar F (Collaborator), Reddy U (Collaborator)					USDA	1		\$500,000-11/15/21 to 11/14/25-Funds did not come to A-State; Inter American University of Puerto Rico - Barranquitas
ARA Impact Grant 3.0 - Development of Phenolic-Rich Nutraceuticals for Healthy Aging	Medina-Bolivar F, Schmid E (Co-PI)			\$75,000		ARA	1,2,4		
SURF_Salma Abdel-Karim: Anti-Inflammatory Properties of Isoflavones from Pigeon Pea Hairy Root Cultures	Medina-Bolivar F			\$2,750		ADE DHE	1,2,4		
Investigating Regulatory Mechanisms Controlling Induction of an Integrative and Conjugative Element	Shields, Robert	\$30,783	0.50				2		
Functional Characterization of Gram-positive Hypothetical Genes	Shields, Robert			\$132,744	0.50	NIH (AR INBRE)	2	90 UAMS	

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Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
Systematic Functional Genomics Analysis of the Oral Pathogen <i>Streptococcus Mutans</i>	Shields, Robert			\$139,720	0.25	NIH	2		
Mechanisms of Integrative and Conjugative Elements in Oral Bacteria	Shields, Robert			\$360,555		US Dept of Health & Human Services	2		
Assessing the impact of Agr quorum sensing on <i>Staphylococcus aureus</i> physiology in the space flight environment	Rice, Kelly; Shields Robert (Co-PI)					NASA	5		\$250,000-2021 to 2024-Funds did not come to A-State; University of Florida
Startup Funding - Investigation of actin dynamics and inflammation in aging and age-associated diseases	Schmid Edward (Ted)	\$14,970					2		
F-actin accumulation drives beta-amyloid-induced neurodegeneration in <i>Drosophila</i>	Schmid Edward (Ted)			\$153,517	0.50	Arkansas INBRE	2		
Startup Funding - Engineering & Construction Management	Sokolov, Alexandr	\$21,377	0.50				5		
Benchmarking Genomic Comparison Tools Across Different Organisms (INBRE Collaborative Research Grant (CRG))	Stubblefield, Jonathan			\$55,552	1.08	NIH (AR INBRE)	2		University of AR Medical Sciences
COLLABORATIVE RESEARCH: Unraveling the Phylogenetic and Evolutionary Patterns of Fragmented Mitochondrial Genomes in Parasitic Lice	Sweet, Andrew			\$165,541		NSF	5		
Enhanced Synthetic Microbiome Communities to Managed Sudden Death Syndrome	Wijeratne, Asela, Mangan, S (Co-PI)			\$18,109	0.50	United Soybean Board	1		Mid-South Soybean Board
ARA Fellows Program Grant 2023 -2025	Xu, Jianfeng (Jay)			\$25,000	1.00	AR Research Alliance	1,2		
Engineering Novel Designer Biologics in Plant Cells for Oral Treatment of Ulcerative Colitis	Xu, Jianfeng (Jay)			\$131,747	0.04	NIH	1,2		
Engineering GPI-anchored Proteins in Plant Cells for Enhanced Protein Production and Applications	Xu, Jianfeng (Jay)-PI, Dolan, Maureen			\$131,354	0.58	NSF	1,2		
Advancing Benthic Algal Quantification: Evaluating Microscopy and QCR Methods Using Experimental Stream Data	Zhang, Chiqian			\$55,000		US Environmental Protection Agency	5		

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Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
Recovery Funding Reinvested in Research				\$206,939		External Usage Revenue			
Animal Care Core		\$140,828	2.00						
Capital Purchases for Research		\$107,028							
Greenhouse/Growth Chamber/Infiltration Core		\$89,051	1.00						
Research Salary Support and Internships		\$1,031,772	10.60						
Outreach		\$84,630	1.00						
ABI Administration		\$408,509	7.50						
Utilities, Custodial, Building Repairs, and Equipment Service Contracts		\$952,063	3.00						
Total for A-State		\$ 2,932,274	27.10	\$ 3,928,203	14.02				

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
UNIVERSITY OF ARKANSAS SYSTEM DIVISION OF AGRICULTURE									
1. Investigating Microbiome's Role in Neuropsychiatric Disorders in Quest of Novel Therapeutics Using Computational Methods	A. Goswami, S. Howe	\$89,457	0.60	\$55,478	0.50	Arkansas Resesarch Alliance	3	91 UAF	
2. Genome sequencing of native and invasive stinkbug threats to Arkansas rice	R. Adams, A. Szalanski	\$96,286	0.25	\$208,969	0.05	NSF	1, 5		
				\$16,192	0.05	NSF			
3. Assessing the Role of Higher Protein Diets in Managing Metabolic Complications of Polycystic Ovary Syndrome (PCOS)	J. Baum, E. Borsheim, X. Liang, E. Hickey	\$89,585	0.35	\$296,129	0.05	National Cattlemen's Beef Association	1, 4	92, 93 UAMS, UAF	
				\$970,146	0.20	USDA-NIFA-AFRI			
4. Role of Spirulina platensis in ameliorating heat stress productivity losses in broilers	S. Dridi, S. Orłowski, E. Greene, S. Yeol, R. Sims	\$178,699	0.50				2, 4, 5		Texas State University
5. Exploring the potential of cold plasma for pesticide residue degradation in rice	R. Kariyat, M. Rahman	\$37,115	0.10				1		
6. Development of anti-microbial films from agricultural byproducts for medical applications	M. Rahman, K. Walters, J. Acuff	\$77,643	0.21				1	94 UAF	
7. Porous Starch as High-Loading Controlled-Release Matrices for Bioactive Compounds	Y. Wang, S. Lee	\$157,210	0.20				1		

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Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
8. Unraveling Aflatoxin Inhibition	B. Bluhm, J. Lay, J. Flaherty, A. Fakhoury	\$110,857	0.40	\$59,647	0.10	National Corn Growers Association	1, 2, 4, 5	95 UAF	Coker University, Southern Illinois University
				\$45,000	0.10	Ark Corn and Grain Sorghum Promotion Board			
				\$40,000	0.10	Ark Soybean Promotion Board			
9. Dissecting Molecular Mechanisms of Woronin	M. Egan	\$90,497	0.10				1		
10. Development of Next-Generation Probiotics to reduce antimicrobial resistance (AMR)	J. Zhao, S. Howe, T. Tsai, C. Maxwell	\$156,898	0.35	\$225,000	0.10	USDA-NIFA-AFRI	1		
11. Novel 3D Food Printing Technology for Delivering Functionally Active Probiotics	A. Ubeyitogullari, S. Lee	\$134,603	0.15	\$299,996	0.08	USDA-NIFA-AFRI	4		
12. Building Capacity in Bioimaging	F. Goggin	\$183,016	0.05				2, 4		
General Support (Administrative fee and misc. operating expenditures)	All PI's	\$100,000					5		
Total for UADA		\$ 1,501,866	3.26	\$ 2,216,557	1.33				

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
UNIVERSITY OF ARKANSAS - FAYETTEVILLE									
Genetic basis of variation in carbohydrate-rich diet induced diabetic-like traits in Drosophila	X. Zhuang			\$148,585	0.6666	NIH	4,5		
Genetic basis of variation in carbohydrate-rich diet induced diabetic-like traits in Drosophila	X. Zhuang			\$225,000	0.4166	NIH	4,5		
A large memory computation node for omics research at the University of Arkansas	X. Zhuang					NIH	4,5		
A large memory computation node for omics research at the University of Arkansas	X. Zhuang					NIH	4,5		
An inducible Drosophila model to study genetic modifiers of insulin deficiency	X. Zhuang					NIH	4,5		
An inducible Drosophila model to study genetic modifiers of insulin deficiency	X. Zhuang					NIH	4,5		

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Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
Developing an Electron Beam-treated, Multi-strain Bacterial Vaccine to Control Broiler Chicken Lameness due to Bacterial Chondronecrosis with Osteomyelitis	A. Alrubaye	\$49,689.79	0.75					96, 97 UAF, UAMS	
Understanding Nutrition through Machine Vision	A. Brownback	\$66,471.00		\$219,334	1.44	USDA	1, 4	98,99 UAF, UADA	
Development of a Nasal Airway-Lung-on-Chip (AirLOC) to Study Infectious Diseases that Affect the Respiratory Tract	K. Balachandran	\$ 52,903.00	1	\$50,000	1	DOD	2,3		
Light-Activated Trimodal Nanoconstructs for Drug-Resistance Bacterial Infections	J. Chen								
CAS: Template Directed Synthesis of Earth Abundant Metal Oxide and Chalcogenide Nanoshells	J. Chen			\$164,532	1	NSF	5		SSRL, BNL
Hyperstable FGF1-FGF2 Based Therapeutic Formulation for Wound Care	S.T.K. Thallapuram			\$145,088	0.25	NIH	5		
Quantifying Gene Expression in Bone-Metastatic Cancer Cells on Liquid Crystalline Substrates	L. Harris	\$49,910	0.375						
Development of anti-microbial films from agricultural byproducts for medical applications	M. Rahman	\$49,964.00		\$3,203.97	0.41665		1	100,101,UAF, UADA	N/A
Hyperspectral NIR Darkfield Microscope for Human-Health and Environmental In-Situ Characterization	K. Walters	\$166,816.00		\$13,491.97	0.8333		5	102,103 UAF, UAPB	N/A
H/D Exchange for Protein Structure/ Stability at the Peptide Level: FGF and Mutants	J. Lay	\$30,000		634526		NSF	1,2,4,5		
Development of a Modular Nanocomposite Platform for Targeted Near-Infrared Bioluminescence Imaging	L. Guo	\$ 39,723.20	0.75				3,5		
Unlocking Therapeutic Potential for Targeting the Respiratory Syncytial Virus Fusion Protein	M. Moradi	\$27,294	0.75				5		
Thermodynamic Characterization of Functionally Important Conformational Changes in Human Glucose Transporter GLUT1	M. Moradi						2, 5		

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Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
Differential Dynamic Behavior of Spike Protein in SARS-CoV-1 and SARS-CoV-2	M. Moradi			\$28,000	0.75	NIH	5		
Characterizing Structural Dynamics of Influenza Hemagglutinin Protein as a Drug Target	M. Moradi			\$364,373	5.5	NIH	5		
Characterizing Lipid Modulation of P-glycoprotein Structural Dynamics at the Molecular Level"	M. Moradi						5		
Molecular Dynamics Studies of Mechanosensitive Channel of Large Conductance	M. Moradi						5		
Molecular-level Characterization of Peptide and Peptide-like Drug Uptake Mediated by Proton-coupled Oligopeptide Transporters	M. Moradi			\$131,800	0.5	NSF	5		
Quantifying cellular and metabolic treatment response of multicellular spheroids after exposure to chemotherapeutic, checkpoint inhibition, and macrophage targeted therapy regimens	T. Muldoon	\$16,874	0.375			N/A	2		
The role of intrinsic cellular metabolism and cytoskeletal polymerization on macrophage activation leading to tumor cell phagocytosis	T. Muldoon			\$100,000	2	NSF	2		
The role of pro-angiogenic gene expression in neoadjuvant chemotherapy for locally advanced colorectal cancer	T. Muldoon				2	NSF	2		
Longitudinal assessment of host immune response during biomaterial-enhanced muscle repair via implantable-fiber fluorescence lifetime spectroscopy	T. Muldoon				2	NSF	2		
Enhanced X-ray Diffraction Data Collection for High-Resolution Structure Determination	J. Sakon	69,123.00					4, 5		
Single-cell multiomic analysis of the gene regulatory landscape for mechanoreceptor development in an animal with whole-body regenerative potential	N. Nakanishi	52,157.73					2, 5		

APPENDIX 1: ABI-SUPPORTED RESEARCH FOR 2025

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
A large memory computation node for omics research at the University of Arkansas	X. Zhuang	64,05					5		
Acquisition of a mosquito Xtal3 drop-setter (crystallography robot)	J. Sakon	80,21					2, 4, 5		
Establishing a new animal model for understanding the fundamental mechanism of mechanoreceptor regeneration	N. Nakanishi				2	NSF	5		
Investigating the early evolution of gene regulatory mechanisms underpinning mechanoreceptor development in animals	N. Nakanishi			764,975	2	NSF	5		
Live-cell imaging system to study dynamics of cellular processes in biology and medicine	N. Nakanishi				1	NSF	5		
Acquisition of a laser-scanning confocal microscope for real-time imaging of subcellular dynamics in cells and developing organisms	A. Pare			1,150,000	1	NSF	5		
Optical spectroscopy of the hallmarks of oral cancer	N. Rajaram	\$30,144	0.75	\$264,000	1.89	USDA	2,3	104 UAF	UAMS
1. Protective Behavioral Strategies: A Mixed-Method Examination of Use in Risky Drinking Contexts	L. S. Ham, B. L. Zamboanga, L. B. Quetsch	\$20,187	0.75	\$75,000	1	NIH	5	105 UAF	
2. Negative Urgency and State-level Fluctuations in Alcohol Cognitions: An Experimental Examination of Mechanisms Underlying Addictive Behaviors	L. S. Ham, N. Wolkowicz, J. Veilleux						5	106 UAF	
2. Staphylococcal Capsule Virulence and Regulation	K. N. Jozkowski, L. S. Ham, T. L. Marcantonio						5	107 UAF	
RII Track-2 FEC: Membrane Purification Platform for Continuous Biomanufacturing of Viral Vectors and Virus-like Particles in Arkansas and Beyond	X. Qian			50000		NSF	1, 5	108 UAF	
Acquisition of HyPix-600HE hybrid photon counting detector and universal kappa 4-axis goniometer for the Xray diffraction system was funded through	F. Wang			250000		NIH	1,5	UAF UAMS 109, 110	

APPENDIX 1: ABI-SUPPORTED RESEARCH FOR 2025

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
Acquisition of HyPix-600HE hybrid photon counting detector and universal kappa 4-axis goniometer for the Xray diffraction system was funded through	F. Wang			50000		NIH	1,5	UAF, UAMS 111, 112	
2022: Development of a synthetic biology platform for immunomodulation in skeletal muscle repair	C. Nelson			1831417	5	NIH/NIGMS	2		
2023: A versatile long-read sequencing method for analysis of DNA-editing therapies	C. Nelson, S. Ussery					NIH/NIGMS	2		
2024: A Rapid Reverse Genetics Screening Mouse for Skeletal Muscle	C. Nelson, K. Murach	\$ 43,936.00	0.75			NIH/NIGMS	2		
2021: Efficient Genome Engineering Enabled by Nucleofector Technology to Support Biomedical, Biotechnology, and Translational Research Objectives	C. Nelson			513,653	2	DoD/CDMRP	2		
2023: Optimizing delivery of non-immunogenic lipid nanoparticles to target antigen-presenting cells to induce immune tolerance in Type 1 Diabetes	C. Nelson					DoD/CDMRP	2		
2021. Creating the Next Generation Microdialysis Probes via 3D printing with 2-photon lithography	J. Stenken						5		University of Kansas
2022. 3D Printed Microsampling Probes	J. Stenken			147519		NIH	5		University of Kansas
Utilizing CRISPR/Cas-9 gene editing to determine the genetic basis of visual attraction	E. Westerman			\$287,048	2.1	NSF	1,5		
Genetics and neurogenomics of preference learning	E. Westerman			\$200,000	1.5	NSF	1,5		
Genetics and neurogenomics of preference learning	E. Westerman			\$287,048	2.1	NSF	1,5		
Studying the Role of Acetylation of Phosphofructokinase in Human	C. Fan	\$41,356.20	0.75				2,4		
1. Understanding flagellar dynamics and bacterial motility in mucus (2024-25)	Y. Wang	\$33,855.20	0.75				3,5		
2. Investigating the equilibrium folding energy of small RNAs using molecular springs (2021-22)	Y. Wang				1	NSF	5		

APPENDIX 1: ABI-SUPPORTED RESEARCH FOR 2025

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
2. Investigating the equilibrium folding energy of small RNAs using molecular springs (2021-22)	Y. Wang				1	NSF	5	UAF 113	
3. Understand the biomechanics of bacterial cytoplasm and its temperature dependence (2020-21)	Y. Wang				1	NSF	5	UAF 114	
3. Understand the biomechanics of bacterial cytoplasm and its temperature dependence (2020-21)	Y. Wang			\$43,800	1	USDA	5	UAF, UADA 115,116	
3. Understand the biomechanics of bacterial cytoplasm and its temperature dependence (2020-21)	Y. Wang			\$6,000		NIH	5	UADA 117	
4. Origin of high flexibility and bendability of double-stranded DNA (2019-20)	Y. Wang			\$25,000	1	NSF	5		
4. Origin of high flexibility and bendability of double-stranded DNA (2019-20)	Y. Wang			\$100,000	1	NSF	5	UAF 118	
5. Investigating the Dynamic Diffusion of Proteins in Live Bacteria with Ultra-High Spatiotemporal Resolutions (2018-19)	Y. Wang				1	NSF	5	UAF 119	
5. Investigating the Dynamic Diffusion of Proteins in Live Bacteria with Ultra-High Spatiotemporal Resolutions (2018-19)	Y. Wang					NIH	5	UADA 120,121	
5. Investigating the Dynamic Diffusion of Proteins in Live Bacteria with Ultra-High Spatiotemporal Resolutions (2018-19)	Y. Wang				1	USDA	5	UAF, UADA 122, 123	
Investigating metabolic regulation of therapeutic matrix remodeling by MSCs	Y. Song						2,5		
Assessing collagen topography roles in neuro-regenerative behavior of adipose-derived stem cells	Y. Song						2,5		
Determining the Role of Pancreatic Cancer-Derived Extracellular Vesicles in Perineural Invasion	Y. Song						2,3,5		
NanoSight NS300 Nanoparticle Tracking Analysis Equipment to Support Biomedical, Environmental, and Nutritional Nanomaterials Research	Y. Song						2,4,5		

APPENDIX 1: ABI-SUPPORTED RESEARCH FOR 2025

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
Investigating the bioenergetics of tumor cell clustering and cell-cell interactions	J. Zhang			\$144,581	1	NIH/NIGMS	2, 4		UAF
Role of Protein-Lipid Interactions in Modulating Structure and Function of Membrane-Bound Proteins Using Single Molecule FRET and All-atom MD Simulations	C. Heyes	\$39,771.00	0.75						
Microbiome-derived Arginase-1 as a Route to Colorectal Cancer Treatment: Engineering Human Gut Flora to Deliver Biotherapeutics	H. Aljewari	\$50,617.00	0.5						
Understanding the Mechanism of Action of a Novel Antifungal Peptide in Candida Species	I. Pinto	\$28,286.00	0.75						
Elucidation of Proton-Coupled Electron Transfer (PCET) Kinetics of Biologically Relevant Phenolic and Catechol Compounds and Applications in Sensing	I. Fritsch	\$29,922.00	0.33						
Using Generative AI Models to Identify Tobacco Addiction and Create Intervention Messages on Social Media Platforms	K. Luu	\$31,834.00	0.75						
Social Media Video Analysis for Identifying Tobacco Usage Violations and their Correlation with Depression using Generative AI Models	K. Luu	\$103,625.00							
Evaluating the Sensitivity of a Hyperspectral Autofluorescence Imager to Skin Wound Metabolism	K. Quinn	\$39,538.00	0.75						
Characterization of Biomolecule Aggregation with a Polymer-Electrolyte Enhanced Nanopore	M. Edwards	\$20,641.00	0.75						
Nanoparticle Based Approach for Homogeneous Stem Cell	R. Rao	\$42,596.00	0.75						
Nanoparticle Based Approach for Homogeneous Stem Cell	R. Samsonraj	\$48,602.00	0.75						
Age-Related Sarcopenic Obesity, Sex Differences, and Senescence	T. Washington	\$24,682.00							
COBRE Pilot Project Commitment	S.T.K. Thallapuram	\$24,301.50	0.375	\$1,985,281		NIH			UAMS

APPENDIX 1: ABI-SUPPORTED RESEARCH FOR 2025

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
COBRE Pilot Project Commitment	K. Murach, M. Rosa-Caldwell	\$49,336.63							
COBRE Pilot Project Commitment	L. Harris	\$24,972.42	0.375						
ABI Research and Equipment Grant 2024: Expanding micro-computed tomography resources	C. Terhune	\$64,411.00	0.25						
Innovative and Collaborative Pilot Project, Phase 2	J. Leong, W. Shew	\$84,868.26	1				2		
Equipment replacement to facilitate collaborative poultry research	D. Rhoades	\$37,851.00					1, 2		
Beyond discovery: bat behavior and virus shedding as drivers of spillover risk	K. Forbes			\$75,820	0.75	Canadian Institutes of Health Research	5		
Total for UAF		\$ 1,689,163	15.83	\$ 10,479,076	50.11				

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
UNIVERSITY OF ARKANSAS FOR MEDICAL SCIENCES									
Inflammation and Oxidative Stress Affect Neuronal Anatomy and Cognitive Function	Antino Allen	\$50,000	0.25	\$307,350	2.73	NIH/NCI	1,5		Colorado State University
				\$332,317	8.00	NIH/NIGMS			
Dissecting Cellular and Molecular Mechanisms underlying Cardiometabolic Diseases - Diabetes, Obesity and Others	Rushita Bagchi	\$100,000	0.20	\$77,000	0.56	American Heart Association	5		
Developing New Types of Drug Models and Molecular Approaches to Create Alternative Forms of Treatment	Michael Birrer	\$1,460,595	0.60	\$591,106			1,5		
Center for Studies of Host Response to Cancer Therapy	Marjan Boerma	\$100,000		\$125,723	0.60	NIH/NIAID	1,5		Georgetown University
				\$334,337	2.48	NIH/NCI			
				\$45,148	0.25	DOD			University of Texas Southwestern Medical Center
				\$394,309	2.31	NIH/NIEHS			University of Texas Southwestern Medical Center

APPENDIX 1: ABI-SUPPORTED RESEARCH FOR 2025

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
Minority Health & Health Disparities Research	Carol Cornell	\$70,000		\$4,799,359	18.45	NIH/NIMHD	4,5	124 Arkansas Children's Research Institute	ACHI; Arkansas Cancer Coalition; Arkansas Department of Health; East Carolina University; Northwest AR Education Service Cooperative; University of Hawaii; Virginia Commonwealth University
Understanding Cancer Biology to Discover and Develop Improved Methods for Cancer Treatment	Ruud Dings			\$404,746	3.45	NIH/NCI	1,5		
Obesity and Loss of Body Weight Contribution to Skeletal Etiologies	Neha Dole	\$50,000		\$140,899	0.80	NIH/NIDDK	5		
Global Gene Regulation in Staphylococcus Aureus S. Aureus	Mohamed Elasri	\$125,000	1.00				1,5		
Center for Molecular Interactions in Cancer	Robert Eoff	\$100,000	1.23	\$2,295,000	9.44	NIH/NIGMS	1,5		
Multifunctional Nanoparticle Hyperthermia with Enhanced Tumor cellular Efficacy through Exosome Encapsulation and Delivery	Robert Griffin			\$5,531	0.22	NIH/NCI	1,2	125 University of Arkansas	
Improving Prevention and Treatment of Substance Use Disorders	Corey Hayes	\$40,000	0.21	\$51,179	0.29	FDA	5		Chicago Association for Research and Education in Science
Health Disparities, Prevention, Treatment, Informatics and Diagnosis	Ping-Ching Hsu			\$45,418	0.25	DOD	1,5		University of Texas Southwestern
				\$394,309	2.47	NIH/NIEHS			
Innate Immunity in Tuberculosis	Lu Huang			\$193,289	1.15	NIH/NIAID	3,5	126 Arkansas Children's Research Institute	Tufts University
				\$769,925	3.70	NIH/NIAID			
How Epoxy lipids Influence Kidney, Metabolic, and Cardiovascular Function	John Imig	\$50,000		\$514,673	2.76	NIH/NIDDK	1,5		University of Texas Southwestern
				\$190,595	1.20	NIH/NCATS			
Translational Research Institute Clinical and Translational Science Award	Luara James	\$395,000	3.57	\$3,877,947	14.95	NIH/NCATS	1,5	127 Arkansas Children's Research Institute	University of Arkansas Little Rock
				\$152,991	0.49	NIH			Vanderbilt University Medical Center

APPENDIX 1: ABI-SUPPORTED RESEARCH FOR 2025

Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
Utilizing Pharmacologic Approaches and Genetic Models to Examine How the Changes in Neuronal Microenvironmental Affect Cognitive Function	Brian Koss	\$50,000	0.31	\$374,355	2.65	NIH/OD	4,5	128 Arkansas Children's Research Institute	
The Coordinated Host Intrinsic and Innate Immunity for the Development of Cancer Immunotherapy	Jia Liu			\$221,105	0.85	NIH/NIAID	3,5		
Pathogenesis of Hypertension and Its Progression to Heart Failure	Shengyu Mu			\$761,943	3.60	NIH/NHLBI	5		
				\$99,999	0.44	American Heart Association	1,3,5		
Epigenetic Factors Linked to Diseases Across the Lifespan	Nandini Mukherjee	\$33,333	0.29				5		
Center for Musculoskeletal Disease Research	Charles O'Brien	\$100,000	0.81	\$2,295,000	9.64	NIH/NIGMS	4,5	129University of Arkansas	
				\$300,960	1.23	NIH/NIAMS			
Development of New Medications and Combinations of Medication and Behavioral Interventions for the Treatment of Opioid and/or Psychostimulant Dependence and Withdrawal.	Alison Oliveto			\$357,882	3.37	NIH/NIDA	1,5	130 ACRI	New York University
				\$198,790	0.10	NIH/NIDA			University of Texas Southwestern Medical Center
Inhibiting Cancer Growth and Metastasis by Defining and Targeting the Pathways in the Tumor Microenvironment	Steve Post			\$160,937	0.85	NIH/NCI	1,5		
Training in Systems Pharmacology and Toxicology	Paul Prather	\$57,730	0.92	\$355,622	4.00	NIH	1,5		
Center for Microbial Pathogenesis and Host Inflammatory Responses	Mark Smeltzer	\$100,000		\$1,140,000	5.52	NIH/NIGMS	1,2,5	131 Arkansas Children's Research Institute	
				\$451,759	2.55	NIH/NIAID			
Understanding and Improving Health and Developmental Outcomes for Children Impacted by Poverty	Taren Swindle	\$30,000	0.67	\$557,971	7.63		1,5	132Arkansas Children's Research Institute	Arkansas Center for Health Improvement; Louisiana Tech University; University of Colorado
How Histone Marks Contribute to an Epigenetic/Histone Code that May Dictate Chromatin-Templated Functions	Sean Tavena	\$150,000	0.25				5		
The Fundamental Challenge of Drug Resistance	Amit Tiwari	\$50,000		\$42,228	0.03	NIH/NIBIB	1,5		University of Toledo Health Science Center

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Project	PI(s)	ABI \$ Allocated	ABI FTE Employment	Related Extramural \$	Extramural FTE Employment	Extramural Source	ABI Research Areas*	ABI Partners	Other Partners
Expanding UAMS Research Capacity to Establish a Center for Animal Models of Infection and Disease	Dan Voth/ Christy Simecka			\$2,078,867		NIH/OD	1,3,4,5		
Developing New Types of Drug Models and Molecular Approaches to Create Alternative Forms of Treatment	Z.Zhang/M. Birrer	\$82,600	0.17				3,5		
Emotion-related Processes that Influence Trauma-related Mental Health Conditions	M.Zielinski	\$80,000	0.46	\$491,399	7.00	NIH/NIDA	5		University of New Mexico Health Science Center; Rush University Medical Center
Total for UAMS		\$ 3,374,258	11.19	\$ 25,931,968	126.01				
ALL INSTITUTIONS FY2025		\$ 16,077,774	71.68	\$ 58,941,503	258.12			132	

Patent Activity – Patents Filed and/or Awarded July 1, 2024 to June 30, 2025**A. Patent Applications and Provisional Patents:**

Arkansas State University – Alam MA. Thiazole Derivatives and Methods of Using the Same. U.S. Patent Application No. 18/853,013. (2023)

University of Arkansas, Fayetteville – Agrawal SA, Nelson CE. Chemical Modification of Cas Proteins for Enhanced Intracellular Delivery and Therapeutic Gene Editing. U.S. Provisional Patent Application. (2025)

University of Arkansas, Fayetteville – Padmaswari MH, Nelson CE. Identification and Validation of Genomic Safe-Harbor Sites in Skeletal Muscle for Targeted Integration. U.S. Patent Application No. 18/665,417. (2024)

University of Arkansas, Fayetteville – Diaz PM, Ivers JD, Quinn KP, Rajaram N. Method for Classification of Risk of Recurrence in Non-Small Cell Lung Cancer Using Deep Convolution Neural Residual Network Modeling in Label-Free Optical Images. U.S. Provisional Patent Application No. 63/862,476. (2025)

University of Arkansas, Fayetteville – Hoskins JK, Zou M, Pysz P, Stenken JA. Methods of Integrating 2-Photon Lithographic Printed Membranes in Microfluidic Chips. U.S. Provisional Patent Application No. 63/733,794. (2024)

University of Arkansas for Medical Sciences – Koss B, Tackett A, Reed M, Fil D. Leveraging Cancer-Evolved Resistance Mechanisms to Enhance EZH2 Activity in Adoptive T Cells. U.S. Non-Provisional Patent Application. (n.d.)

University of Arkansas for Medical Sciences – Koss B, Tackett A, Edmondson J, Fil D. ATF6 Activation in Tumor Cells as an Immunotherapy Adjuvant or Neoadjuvant. U.S. Non-Provisional Patent Application. (n.d.)

University of Arkansas for Medical Sciences – Koss B, Kelliher J, Xia F, Patra M. Immune Cells with Enhanced 53BP1 and Engineered 53BP1 for Use in Methods of Treating Cancer. U.S. Provisional Patent Application No. 63/716,545. (2024)

University of Arkansas, Division of Agriculture – Ubeyitogullari A, Ahmadzadeh S, Rysener VBJ. System and Method for Three-Dimensional Food Printing. U.S. Published Patent Application No. US20250098725A1. (2025)

B. Patents Received:

Arkansas State University – Murphy W, Fontana GJ, Gaudette G, Weathers P, Dominko T, Rolle M, Hernandez S, Cramer C, Medina-Bolivar F, Binder B. Functionalization of Plant Tissues for Human Cell Expansion. U.S. Patent No. 12,280,177. (2025)

University of Arkansas, Fayetteville – Sakon J et al. Collagen Binding Agent Compositions and Methods of Using the Same. U.S. Patent No. 11,624,060. (2023)

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