

Announcements

New FOAs Released

2022 Summer Research Grants (SRGs): Applications due October 25, 2021.

2022-2023 Collaborative Research Grants (CRGs): Applications due October 25, 2021.

Research Seminar Funding: INBRE funds to support a visiting scientist or seminar speakers.

Applications are reviewed as they are received. <https://inbre.uams.edu/funding-opportunities/seminar-funding/>.

For Bioinformatics Core support, please contact either Drs. [Galina Glazko, Ph.D.](#) (UAMS) or [Phil Williams](#) (UALR). The [Bioinformatics Core Support Request Form](#) can be found on the [INBRE website](#).

Fellowship opportunities are available through NIH for students and postdocs from underrepresented populations. For more information, visit the [iCURE website](#).

The NIH Office of Intramural Training and Education (OITE) offers many free online workshops and webinars for all levels of training. Below are a few links, but please be sure to take a look at the schedule for additional webinars that may be of interest:

October 8, 2–3 pm

[MD and MD/PhD Application Q&A](#)

October 18, 3–4 pm

[Networking for Scientists](#)

October 19, 1–4 pm

[The What and Why of Diversity: A Deep Dive \(DEI Part 2\)](#)

October 20, 2–3:30 pm

[Preparing for the MCAT Part III: MCAT Essentials and Test Day Prep](#)

NIH has a new #COVID [website](#).

Upcoming Meetings

INBRE Fall Conference

October 29 & 30, 2021

Website: <https://inbre.uark.edu/>

Southeast Regional IDeA Conference

November 12-14, 2021 in San Juan, Puerto Rico

Website: <https://www.seidea21.hpcf.upr.edu/>

NISBRE Conference

Washington, DC, in 2022

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Message from the PI



By now everyone should know that two important meetings will be taking place over the next six weeks. First up is the Arkansas INBRE Fall Conference that will be held in Fayetteville October 29-30, 2021. This meeting has always been one of my favorite Arkansas INBRE-sponsored events. The scientific presentations by both faculty and students are uniformly excellent and having an opportunity to spend some time on Dickson Street adds a bit of icing to the cake. Dr. Seymour Wang and the organizing committee are working hard to plan the meeting which will be in-person. In deference to the ongoing pandemic, the meeting will be modified somewhat in order to create a safe environment for attendees. For example, the number of workshops will be reduced and we will not have the traditional banquet at the town center. Attendees will be required to wear a mask at all times during the meeting except when eating or drinking. The second big meeting is the Southeast Regional IDeA Conference that will be held in San Juan, Puerto Rico November 12-14, 2021. Thus far, 175 abstracts have been submitted. I am happy to report that Arkansas will be well represented at the meeting; 33 abstracts have one or more authors who are affiliated with an Arkansas institution. Additionally, three Arkansas INBRE-affiliated faculty, Jianfeng Xu (Arkansas State University), Alan Tackett (UAMS) and Jerry Ware (UAMS) are speakers at the meeting. Dr. Xu is a speaker in Session B.1—Building Collaborative Research across IDeA Programs. Dr. Tackett is a speaker in Session A.2—MultiOmic Approaches through the Looking Glass. Dr. Ware is a panel member in Session C.2—R15 and R16 Program Overview and Panel Discussion. For those of you who are planning to attend the meeting in person, be sure to check requirements for entering Puerto Rico. If you are unable to attend in person, you can still register and attend virtually. There is no registration fee for virtual attendees.

I am looking forward to hearing about all the important research that is being done by faculty and students across the Arkansas INBRE network.

Everyone stay safe and healthy!

Faculty Spotlight: Featuring Faculty with an INBRE Recruitment Package



Kyle Gustafson, PhD
Assistant Professor
Arkansas State University

I earned my BSc (Wildlife Biology) and MSc (Biology) at the University of North Dakota, studying the population biology of hosts and parasites. I did my PhD (Zoology) at Oklahoma State University, studying parasite life cycles and transmission. I went to the University of Wyoming for my 2-yr postdoc where I studied wildlife genomics and disease ecology. I taught at Missouri Southern State University for two years before I took my position as an Assistant Professor at Arkansas State University.

I am a first-generation college student who came across research somewhat accidentally. As an undergrad, I knew I wanted to work with wild animals, but I didn't really understand how. It wasn't until I got my first opportunity to do undergraduate research that I actually saw some of my role models doing research, enjoying their jobs, and earning an income while doing it. I more or less accidentally stumbled into research as paid undergraduate research programs continued to allow me to spend less time working as a waiter and more time in the laboratory.

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There was a perfect storm of events that allowed me to overcome the obstacles faced by poor, first-generation college students. I owe my research career to three professors who mentored me during my early years and, in many ways, still mentor me today. The first event was receiving an NSF Advanced Undergraduate Research Award to study population biology with Dr. Bob Newman at the University of North Dakota (UND). Out of all the professors I have ever interacted with, Bob had the biggest impact on my trajectory as a scientist. Bob was a “thinking man” and promoted deep intellectual thought into my research, which I try to emulate to my students. After the NSF funds expired, I was about to go back to work at a local restaurant, but another opportunity came along. The Ronald E. McNair program allowed me to keep working with Bob until I graduated with a BSc in Wildlife Biology. I stayed at UND for my MSc in Biology where I met Dr. Vasyl Tkach. Dr. Tkach is the most efficient person I have ever met and he taught me how to navigate the molecular and parasitology labs. Dr. Tkach is a humble man who also just happened to be the world expert on trematodes. He treated me as an equal and I am forever grateful for his mentorship. Finally, I did my PhD with Dr. Matthew Bolek. Dr. Bolek is the greatest invertebrate biologist I have ever met. He always seemed to be disorganized, but he was able to take all my scientific ideas, background, and aspirations and help me form an impactful dissertation that would later be awarded the New Investigator Award by the American Society of Parasitologists.

My basic and applied research focuses on understanding the spatial distributions and genetics of hosts and their parasites. I tend to focus my efforts on hosts that are species of conservation concern and on understudied parasites. Currently, I am working on several projects revolving around snails and their parasites (primarily trematodes and coccidia). Snails are primarily responsible for the transmission of an entire class of organisms —nearly 20,000 species of digenean trematodes — which mature in humans and wild vertebrates. Fundamental data on snail taxonomy and distributions in Arkansas is currently unknown. Thus, there is a black hole with regards to understanding their role in trematode infections throughout the state. My lab is also spearheading conservation and disease research on A-State’s mascot, the American Red Wolf.

I was hired in a “diseases in nature” cluster hire with two other biologist and that is the type of research I work on. Basic undergraduate projects include studies on the prevalence and distribution of parasites in various host species. These projects are exceptionally well-suited for students interested in medical school, tropical diseases, veterinary school, or wildlife biology. Graduate projects tend to have a theoretical foundation and most often include understanding parasite and host populations using molecular markers. Currently, I have students working on projects identifying trematodes and coccidian from snails throughout the state of Arkansas. Roughly 20,000 trematode species would not exist without snails because snails are a required host in nearly all of their life cycles. Specific snails transmit specific trematodes that may later infect humans, domestic animals, and wild animals. Snails coccidia are currently undescribed, but have the potential to regulate snail populations. Looking at the interactions of trematodes and coccidian could be extremely important for managing snail-borne diseases to humans and other animals.

Last year I had four undergraduates working on parasitological projects. This year, I will likely have seven or more undergraduates working on various projects. There are many joys to mentoring undergraduate students. Training a student on a skill that seemed impossible to them and watching them perform it as if they have been performing it their whole life is extremely rewarding. All my students go through this with microscopy, slide making, and PCRs. Similarly, early-stage students often have little-to-no idea why they are working on a specific project. They understand that parasites are harmful and could kill the host, but slowly building an ecological and evolutionary foundation around their projects makes them understand their project and science in a much more useful way.

I am extremely fortunate to have the INBRE New Faculty Recruitment Package award. I was able to purchase a beautiful differential-interference contrast microscope my first year. Not only does it serve my INBRE-funded undergraduates and department-funded graduate students, but the microscope has already supported projects

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from other labs, including numerous undergraduate and graduate students. Multiple years of funding will allow me to strategically expand my research program to fully complete my microscopy lab, genomics lab, and my aquatic-experimental lab. I have received the New Faculty Recruitment Package and also a voucher for genomic sequencing. I have many publications in the works, but as an early-career professor at A-State, my lab is still being populated with students and projects. Data are now being collected and publications are likely to follow.

What you might not know about Dr. Gustafson...

My hobbies are endless and include spending time with my wife and 2 children, rock climbing, microscopy, and dungeons and dragons.

Faculty Spotlight: Featuring Faculty with an INBRE Recruitment Package



Surya Banerjee, PhD
Assistant Professor
Arkansas Tech University

I started with Arkansas Tech University (ATU), Russellville in the Fall 2020. I am specialized in teaching genetics, cell and molecular biology, and developmental biology courses.

I have a Bachelor's of Science degree in Zoology with Honors and a Master's of Science in Genetics from the University of Calcutta, India. I received my doctoral degree in Biology from the New Mexico State University, followed by postdoctoral training at Yeshiva University. I had Dr. Jennifer Curtiss and Dr. Josefa Steinhauer as my Ph.D. and Postdoc mentors who had great influence in my career.

"Find It, Lose It, Move It" is the basic strategy that geneticists use to study the function of a novel gene that I learned from the Developmental Biology text book by Gilbert. The approach was easy to understand and made me curious: how it worked, what were the tools and techniques available, and how could this approach be used to treat diseases? Using this approach, I started doing my research to answer the fundamental question: which are the master regulatory genes and what type of protein interactions determine that a tissue will turn into an eye or the brain, in the right place of the body? My engagement with research piqued my interest to know the spatial and temporal regulation of cellular and molecular processes that control development. My dissertation research forged new ground in understanding the molecular mechanisms of how nutrients control metabolism and affect development, fertility and disease conditions.

I started my doctoral research as a molecular biologist working on tissue specification using development of the eye as a model in the fruit flies. The project was challenging and it was taking longer to answer the research questions. I was frustrated. During this time, I started characterizing a novel gene called "Nepriylsin like 15" that came out as a candidate for eye development in a screening in the fruit flies. It was to our surprise

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that the gene actually had a role in nutrient storage, and it affected development and longevity as well. These new findings kept me motivated and I remain persistent in research. I used CRISPR-Cas9 technique successfully to tag endogenous genes and to mutate a gene in flies. These achievements had the biggest impact in moving my research career forward.

I use the model organism *Drosophila melanogaster*, the fruit fly, to study the genetic basis, and the cellular and molecular mechanism of – (i) nutrient homeostasis and metabolism; (ii) neuromuscular disorder and its effect on fertility; and (iii) tissue specification and organ development. My current research investigates the underlying mechanisms by which Nepilysins (Neps) affect nutrient homeostasis and control symptoms associated with metabolic disorders such as obesity and diabetes. Metabolic disorders have emerged as major life-threatening diseases which also cost millions of dollars for treatment and care, warranting effective alternative treatments. In the last two decades, a family of proteins called Neps, has emerged as a possible candidate for treating obesity and type II diabetes in mammals including humans. Very little is known about how Neps can affect such metabolic disorders. We have been able to determine that Neps regulate carbohydrate and lipid reserves in the storage organs, and by doing so they can exert effects on the development and life span of the fruit fly. With the help of INBRE funds more efforts has been applied in my lab to elucidate the cell signaling pathways that are controlled by Neps, so that effective methods to control metabolic diseases can be proposed. For example, we are interested to determine if expression of major enzymes contributing in carbohydrate and lipid metabolism have been altered due to mutation in Neps. Also, we want to test how reduced nutrient storage in Nep mutants may affect health and longevity. Recently, I have published two peer reviewed articles on the first two topics of my research.

There have been seven undergraduate students actively participating in my research projects funded by AR-INBRE at ATU. They are doing research for the first time. It is challenging to train the undergraduate students but it is very rewarding to see them becoming technically skillful and research minded. I truly enjoy when they propose new hypotheses, alternative research approaches and jumps into trouble shooting. I become very excited when I see the students working hard, being able to explain critical concepts, and are ready to accept additional responsibility including teaching a new peer. Two students have already given a talk in the ATU undergraduate research symposium. We are generating new data which we will present at conferences and will publish in peer reviewed journals. I am very confident that this research experience will have a positive impact in shaping their careers.

INBRE has had a huge impact on my career. My journey with INBRE began when I received my first graduate travel award from NM-INBRE in 2013 during my Ph.D. Since 2020, the Arkansas INBRE has supported my journey as an Assistant Professor at ATU in many ways. The AR-INBRE workshops on genomics, grant writing, using the core facility etc. steered my research, proposal submissions and opportunities for collaboration. As a principal investigator, I have received a three-year long New Faculty Recruitment Grant from the AR-INBRE. The start-up funds have been extremely useful for me to build and organize the resources necessary for my research. Additionally, I received an award for a summer Research Grant from the AR-INBRE. These grants have been instrumental in initializing pilot projects, and involve undergraduate research students for hands-on research at ATU.

What you might not know about Dr. Banerjee...

I love cooking and I am a foodie. While explaining my research or teaching in the classroom, I often draw analogies from food, which makes my students laugh. This makes me feel happy as I connect research topics with life experiences.

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Development Research Project Program

Jerry Ware, PhD, Program Director



Reminders:

We have two upcoming proposal submissions both due Oct 25th. One submission is for the 2022 Summer Research Proposals and the other being the Collaborative Research Grants. The FOAs can be found on the Arkansas INBRE website. As I reminder applicants cannot directly submit their proposals to the INBRE. All proposals must be submitted by the signing official of your institution. No exceptions can be made. If you are interested in reviewing (and applicants cannot be reviewers) contact me for more information.

Upcoming:

Expect to see an FOA for equipment awards in mid-October with a due date in early January 2022. Specifics will be in the FOA but expect the award maximum to be in \$25-30K range. As always equipment requests that benefit more than a single laboratory are typically reviewed more favorably. And the possibility of the equipment supporting other educational activities, such as a teaching lab, is generally viewed as a positive.

We will likely be able to offer once again the Summer Manuscript Support – 1 month of faculty salary and we anticipate an FOA in November with a due date in early January 2022. The first summer's feedback for this program has been very positive, both from the applicants and as seen by the success rates for manuscript submissions and acceptances. A big Thank You to those who used the support to get their data, and student data, submitted to journals as manuscripts.

Our larger faculty support grants, Research Development Grants or RDGs, will once again be up for competitive review. We anticipate an FOA in the Spring of 2022 with a start date of January 2023. As this date gets closer and you have questions, please feel free to reach out.

Congratulations:

Finally, a Big Congratulations to Jay Xu, Arkansas State, for his recent NIH R15 award. Jay has been an outstanding investigator with the Arkansas INBRE. His new project focuses on anti-inflammatory products to generate novel therapies for ulcerative colitis and Crohn's disease. Jay is just the latest extramural awardee from our INBRE network. It is great to see Jay's expertise with recombinant protein production in tobacco plants now recognized with NIH extramural funding.

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Student Spotlight



Andrea Cooper, MS

2011 INBRE Summer Fellow

When I was a junior at the University of the Ozarks, our campus Biological Society hosted a colloquium with Dr. Alan Tackett, a UAMS professor and researcher, as the guest lecturer. At the time, I was unsure of what I wanted to do after graduation, but I was looking into several professional programs. I had previously completed a retrospective case study at Arkansas Children's Hospital and was gaining a bit of research experience through our campus Chemistry Department; however, I also wanted the opportunity to work in a larger lab. After Dr. Tackett's presentation, I spoke with him more in depth which is where I learned about the SURF and INBRE programs at UAMS. When I expressed my interest in summer research, he encouraged me to apply to both programs. His advice paid off when I had the good fortune of being offered a position in each program. I ultimately selected INBRE because I felt the educational programming and mentorship would help me discern a more definitive career plan.

While working in Dr. Tackett's lab, we examined the up-regulation of the protein EZH2 in metastatic melanoma. I enjoyed the work, but even more so the people. I loved coming into the lab every day because I was surrounded by graduate students and fellows who were excited about their research. I was excited too, but mostly because of them. Through INBRE, I realized that you can have a passion for science without being a scientist (or more traditionally, a physician). Many students enter the field with tunnel vision, and I was admittedly one of them. By the time I was done with my summer research, I had pretty much abandoned all desire to become a physician and started thinking about graduate school. When I came back for my senior year, I started investigating graduate programs and trying to figure out exactly what I wanted to do. It took time, but through a bit of reflection, I realized I was more excited by the people and the programming than actual research. As I thought about next steps, one of the UAMS graduate school reps came to mind. I had met her over the summer and learned that she had earned her PhD in Molecular Biology and Biochemistry. It almost felt like permission to deviate from the expected. The fact that she had done it, meant that I could too. As odd as that sounds, it helped me articulate what I wanted to do – which was to work with students in the sciences. That vision has evolved overtime, but led me to College Admissions directly after graduation. I had originally planned to take a gap year, but landed a job as an Admissions Representative at Arkansas Tech University. The job wasn't initially on my radar, but when I saw an opening it seemed like a foot in the door. I initially felt it would be great professional experience to later working in a medical college, but I was open to change. Through my position, I was able to take graduate courses and earned a Master's degree in College Student Personnel. After earning my Master's, I accepted a position as a College Counselor at Subiaco Academy where I worked until this past February. Over the summer, I completed my MS in School Counseling and accepted a position at my alma mater to serve as the Director of Career Services. In many ways, I provide a lot of the same support and guidance as I did before, but I'm excited to be working with young adults as they are discerning their own career paths.

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What you might not know about Andrea ...

Like so many others, I love home improvements. My husband and I have renovated several homes together and are in the midst of kitchen and bathroom renovation! In other exciting news, I recently finished my Master's in School Counseling and Leadership this past summer!

Recent Publications

Dagtas S, Griffin RJ. *Nigella sativa* extract kills pre-malignant and malignant oral squamous cell carcinoma cells. *J Herb Med.* 2021 Oct;29:100473. doi: 10.1016/j.hermed.2021.100473. Epub 2021 May 21. PMID: 34485026; PMCID: PMC8415487.

Yuan Y, **Wang F.** A comparison of three DFT exchange-correlation functionals and two basis sets for the prediction of the conformation distribution of hydrated polyglycine. *J Chem Phys.* 2021 Sep 7;155(9):094104. doi: 10.1063/5.0059669. PMID: 34496578; PMCID: PMC8425985.

Alkhaibari IS, Raj K C H, Alnufaie R, Gilmore D, **Alam MA.** Synthesis of Chimeric Thiazolo-Nootkatone Derivatives as Potent Antimicrobial Agents. *ChemMedChem.* 2021 Sep 6;16(17):2628-2637. doi: 10.1002/cmdc.202100230. Epub 2021 Jun 9. PMID: 33955181; PMCID: PMC8429137.

Wang J, Garg S, Landes RD, Liu L, Fu Q, Seng J, Boerma M, Thrall K, Hauer-Jensen M, **Pathak R.** Differential Recovery of Small Intestinal Segments after Partial-Body Irradiation in Non-Human Primates. *Radiat Res.* 2021 Aug 1;196(2):204-212. doi: 10.1667/RADE-20-00272.1. PMID: 34043805; PMCID: PMC8440418.

#sharingnews

Congratulations to Fernando Lopez, a 2019 INBRE Alumni, who started his graduate career this summer in Los Angeles where he will pursue a PhD in Chemistry at UCLA.

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A HUGE thank you to all of the 2021 INBRE Summer Program mentors. Without you we could not have held such a successful program this summer.

UARK Campus: Drs. Fiona Goggin, Maggie He, Joshua Sakon, Suresh Kumar Thallapuranam, Yong Wang and Feng Wang.

UAMS Campus: Drs. Antiño Allen, Steven Barger, Gunnar Boysen, Teresita Bellido, Ricky Edmondson, Robert Eoff, Craig Forrest, Lin-Xi Li, Justin Leung, Roy Morello, Melda Onal, Dennis Province, Linda Larson-Prior, Samantha Kendrick, Analiz Rodriguez, Mark Smeltzer, Jason Stumhofer and Alicja Urbaniak.

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