Arkansas INBRE
IDeA Network of Biomedical Research Excellence

INBRE Newsletter **December 2020**
Volume 1 Issue 4

Announcements

A ***BIG*** thank you for the team effort in making the **2020 Virtual Fall Conference** a great success! Thanks to Heather Jorgensen, Drs. Seymour Wang, Jingyi Chen, Ines Pinto, Josh Sakon, Christian Tipsmark, Reeta Vyas and Ying Yuan for devoting a huge amount of time and effort in making this year's conference such a success!

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.

Piestar launch coming soon! Please be sure to watch for emails on upcoming announcements and training opportunities.

Upcoming Meetings

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:
December 14 at 3–5 p.m. Interviewing Skills
December 16 11 a.m.-12 noon Discussion for Building Resilience – COVID Winter & Uncertainty
December 17 3-4 p.m. Discussion for Building Resilience – International Trainees
December 21 10-11 a.m. Discussion for Building Resilience – Trainees of Color
December 22 2-3 p.m. Discussion for Building Resilience – Job Search Stress
December 23 11 a.m.-12 noon Discussion for Building Resilience – Connecting at the Holidays
January 8 11 a.m.-12 noon Applying to Graduate School: Q&A Session
January 12 2-4 p.m. Becoming a Resilient Scientist Series: V. Feedback Resilience
January 28 12:30-1:30 p.m. Postbac Seminar Series
February 4 2-4 p.m. Writing Personal Statements for Medical School

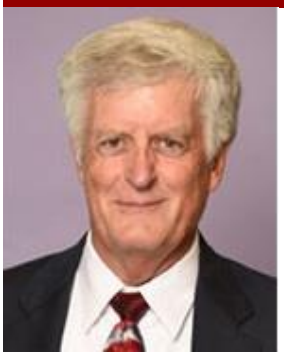
Arkansas Academy of Science
Tentatively scheduled for April 9-10, 2021

Southeast Regional IDeA Conference
June 14-16, 2021 in San Juan, Puerto Rico

RI-INBRE Northeast Regional IDeA Virtual Conference
August 16 - August 18, 2021

NISBRE Conference
Washington, DC, in 2022

Message from the PI



In the midst of the COVID-19 pandemic and despite an ill-timed power outage on the UA campus, Dr. Feng Wang and his team were able to successfully put on the first-ever virtual Annual Arkansas INBRE Research Conference. Dr. Wang is the Director of the Arkansas INBRE Outreach Core. Since 2002, the two-day Conference is an annual highlight for the Arkansas INBRE program that includes oral and poster presentations by students and faculty as well as workshops and a keynote speaker. The meeting's virtual format required meticulous planning on the part of the Conference organizers and some "on-the-fly" crisis management as the result of the power outage. I can't thank enough Dr. Wang, the session chairs, the workshop presenters, judges, and others who worked tirelessly to both plan and execute the Conference. I especially want to recognize the 87 students who presented their research in four biology sessions, three chemistry sessions, and one joint physics/chemistry session. Their talks were uniformly outstanding which made it extremely difficult for the judges to select award winners for each session. With our first virtual Conference in the books, I have to say that already I am very much looking forward to next year's meeting. With any luck, in 2021 we should be back to the "in person" meeting in Fayetteville that has been so successful and fun for me and I think for all of you. Again, a big thank-you to everyone who made this year's Arkansas INBRE Research Conference such a big success.

Stay safe and have a wonderful holiday season.

Faculty Spotlight

Argelia Lorence, PhD
James and Wanda Lee Vaughn Endowed Professor,
Director, A-State Phenomics
Arkansas State University

After having attended a military high school in Cuernavaca, Mexico, Dr. Lorence made the decision to do research. While in school, Dr. Lorence remembers all of her teachers had PhDs already or were in the process of getting one. She remembers them talking about the fascinating research they were involved in and she fell in love. As a freshman in college, she started volunteering in a yeast lab and she has not left a laboratory since.

Since joining A-State in 2005, Dr. Lorence has secured $19 million dollars in funding. She received INBRE funding from 2006 through 2015. The INBRE program provided key mentorship in the beginning of her career as an independent researcher in Arkansas. It also allowed her to leverage the startup funds provided by the Arkansas Biosciences Institute to set up her laboratory, as well as recruit and fund the first cadre of students. She is currently funded by the National Science Foundation (NSF), the Arkansas Research Alliance (ARA), and the Arkansas Biosciences Institute (ABI).

Dr. Lorence directs the Plant Phenomics Facility at A-State and co-leads the Wheat and Rice Center for Heat Resilience (WRCHR; http://wrchr.org/), a consortium of Nebraska, Kansas and Arkansas-based researchers looking for rice and wheat varieties that are tolerant to high night temperature stress. This is the main environmental challenge limiting the yield and quality of rice and wheat, the two most important crops worldwide.

The most significant contribution she has made to plant sciences has been the discovery of a novel biosynthetic pathway for ascorbic acid (vitamin C). Her laboratory uses the model plant Arabidopsis to better understand the role of various subcellular pools of ascorbate in plant physiology. Her ongoing research has potential applications for the development of crops with enhanced nutritional content, better growth, and improved tolerance to multiple environmental stresses. In addition to Arabidopsis, her current models of study include rice, maize and soybeans.

What you might not know about Dr. Lorence…

***She loves* dancing. She was part of a Mexican folk dance team for four years while in junior and high school. As a post-doctoral researcher at Virginia Tech, she was part of the Salsa Club where she had so much fun!**

Development Research Project Program

Jerry Ware, PhD, Program Director

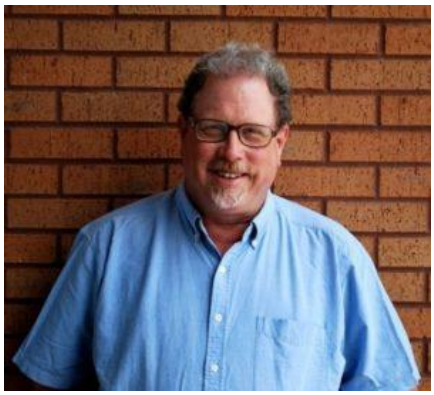
Upcoming Proposal Submission Date:

Summer Research Proposals – due January 11, 2021

(Find the Funding Opportunity Announcements and criterial for submission with this link).

Rigor and Reproducibility: One of the score driving review criteria for NIH proposals is convincing reviewers the application displays **rigor** in design and evidence for an ability to **reproduce** findings. Reviewers are coached to include in their critiques whether rigor and reproducibility have been considered and are adequately supported in the planned research. For example, included in this discussion might be "*the consideration of sex as a biological variable (SABV)*". In other words, are the results validated for both males and females and, if not, is there a justification for limiting the study to one gender? In addition, there is a relatively recent proposal section entitled "*Authentication of biologic reagents*", where the applicant should address how a particular cell line is confirmed to be what it is supposed to be, or how a specific antibody can be confirmed to be the reagent the applicant thinks it is. One of the best ways to demonstrate rigor in the experimental design is careful attention to statistical analysis. For those that have attended one of our grant writing workshops, recall our mentioning a common weakness is the failure to mention statistical analyses in your proposal.

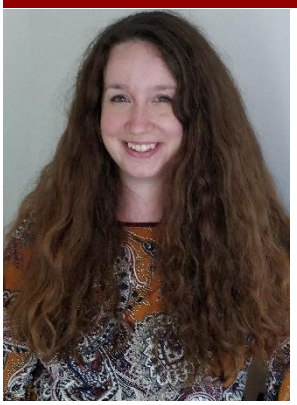
Considering statistical analysis, I would like to introduce a recent addition to the DRPP team, Eric Siegel (UAMS). Mr. Siegel has more than 40 years of experience in biological research, the last 20 of which have been as a biostatistician. If you need help with statistical analysis, please free to reach out to me (jware@uams.edu) and I will connect you with Eric. Perhaps a discussion with Mr. Siegel is needed for manuscript preparation, proposal preparation, or something where you need input from a card-carrying biostatistician. It's an INBRE resource available to all faculty across the INBRE network, so feel free to reach out to us.



UAMS Medical Students and Research: One of my UAMS duties is sitting on the College of Medicine Scholarship Committee. When students apply for available scholarships, there is a section entitled "*Research Experience*". This past summer in evaluating scholarship applications from entering first-year medical students, I tabulated the number of students with undergraduate research experiences associated with the Arkansas INBRE. The committee evaluated 76 applications from students who attended undergraduate colleges in the state of Arkansas. From this group 37% of the applications listed research experience associated with the Arkansas INBRE. Perhaps a new generation of clinician scientists in the making all thanks to the research at our PUIs.

PUI Faculty Recruitment 2021: Recently, the Arkansas INBRE made a faculty recruitment award to Dr. Frank Knight (*Ouachita Baptist University)*. Ouachita Baptist University plans to use the $100,000 award to recruit a person with a background in Anatomy/Physiology and commitment to innovative teaching and undergraduate research to the J.D. Patterson School of Natural Sciences in time for the 2021 Fall Semester. Ouachita Baptist University joins *Arkansas State University*, *Arkansas Tech University* and the *University of Central Arkansas* as recipients of faculty recruitment awards.

Student Spotlight



Jessica Hartman, PhD
2010 Former INBRE Student

My name is Jessica Hartman, and I am currently an Assistant Professor of Biochemistry and Molecular Biology at the Medical University of South Carolina. My lab studies how lifestyle factors shape metabolism and ultimately impact response to toxic chemical exposures. I participated in the Arkansas INBRE program in 2010, so it is just past my 10-year anniversary of participating in the program. It was the summer before my junior year while attending University of Arkansas at Little Rock. At that time, I was a chemistry major, and had been doing research in a Physical Chemistry lab during the prior semester. The INBRE summer research program completely changed the trajectory of my career.

When I applied for the program, I expected to continue my research at UALR in the same lab I had been working in. I can still remember getting the acceptance email from INBRE – I was elated – but as I read further in the email I realized I had been placed in a lab at the University of Arkansas for Medical Sciences. I was terrified. The lab that I was to work in was Dr. Grover Miller's lab, studying inhibition of the enzyme cytochrome P450 2E1 (CYP2E1). I had selected the Miller lab as my top choice at UAMS because he mentioned "kinetics" in the abstract and at the time, I had just learned about simple reaction kinetics in my General Chemistry II class.

Entering the Miller lab, I really had no prior bench research experience, no knowledge of enzymes, and no experience with even simple naming conventions of chemicals. I complained to my family during my first week in the lab that I would *never* learn how to use a multi-channel pipette properly. However, I did learn, and I fell in love with the research. That first summer, I investigated how metabolites from an important pollutant in cigarette smoke and diesel exhaust, a chemical called 1,3-butadiene, can inhibit the enzyme that metabolizes butadiene, CYP2E1. My work from that summer resulted in a first-author publication and jumpstarted my path to where I am today.

I didn't know any Ph.D. scientists growing up (except for Ross Gellar on *Friends*) and going into the INBRE program, I really didn't know that a Ph.D. was even an option for me. Ultimately, my summer research experience made me realize that I wanted to be in a career like Dr. Miller's, and set me on that path. I continued working in his lab for the rest of my undergraduate career, and when it came time for choosing a graduate school, I was accepted to Duke, Vanderbilt, and UAMS and I chose to stay at UAMS to do my Ph.D. with Dr. Miller, who I already knew was an excellent mentor and brilliant scientist.

During my Ph.D., I was supported by a NSF graduate research fellowship and completed a productive thesis project with 15 papers (9 first-author). I went on to do a postdoc at Duke University in the Nicholas School of the Environment with Dr. Joel Meyer, where I was awarded a F32 NRSA Award from NIEHS to expand beyond the biochemistry of CYP2E1 and to look at its effect on the powerhouse of the cell, the mitochondria. During

my postdoc, I started a side project to study the effects of physical exercise on the mitochondria, and successfully applied for and was awarded a K99/R00 Transition to Independence Award from NIEHS to continue that work into my faculty position.

So now I have started my own lab in the wild year of 2020, amidst a pandemic, and moved to the sunny and beautiful city of Charleston. Since our official beginning in October, I have recruited an incredible technician and we hope to have some Ph.D. students and undergraduates joining the group soon. I have come full circle, and now I have the chance to do what INBRE and Dr. Miller did for me – change someone's life. We are recruiting (shameless plug), so please pass along our info to anyone you know who is looking for an exciting lab to work in. http://www.thehartmanlab.org

Jessica's biggest supporter during her research experience has been her husband whom she started dating in 2010. She says he knows her science better than anyone in the world despite being in the field of software engineering. Her hobbies are cooking (not baking) and making wine at home.

Recent Publication

Pinson AO, Pouncey DL, Schleiff MA, Fantegrossi WE, Prather PL, Radominska-Pandya A, Boysen G, Miller GP. Significance of Competing Metabolic Pathways for 5F-APINACA Based on Quantitative Kinetics. Molecules. 2020 Oct 20; 25 (20):4820. doi: 10.3390/molecules25204820. PMID: 33092129 Free PMC article. (A. Pinson, former INBRE Mentored Summer Research Program Fellow)

Karaduta O, **Glazko G,** Dvanajscak Z, Arthur J, **Mackintosh S**, Orr L, **Rahmatallah Y**, Yeruva L, **Tackett A**, Zybailov B. Resistant starch slows the progression of CKD in the 5/6 nephrectomy mouse model. Physiol Rep. 2020 Oct; 8 (19): e14610. doi: 10.14814/phy2.14610. PMID: 33038060 Free PMC article.

Ge X, **Xu J**. Macromolecular crowding effects on transcription and translation are regulated by free magnesium ion. Biotechnol Appl Biochem. 2020 Jan; 6 (1):117-122. doi: 10.1002/bab.1827. Epub 2019 Oct 15. PMID: 31576614

Wang X, Karki U, Abeygunaratne H, UnnoldCofre C, **Xu J**. Plant cell-secreted stem cell factor stimulates expansion and differentiation of hematopoietic stem cells. Process Biochem. 2021 Jan; 100:39-48. doi: 10.1016/j.procbio.2020.09.029. Epub 2020 Sep 25. PMID: 33071562

Alnufaie R, Alsup N, Kc HR, Newman M, Whitt J, Chambers SA, Gilmore D, **Alam MA**. Design and synthesis of 4-[4-formyl-3-(2-naphthyl) pyrazol-1-yl]benzoic acid derivatives as potent growth inhibitors of drug-resistant Staphylococcus aureus. J Antibiot (Tokyo). 2020 Dec; 73 (12):818-827. doi: 10.1038/s41429-020-0341-2. Epub 2020 Jun 29. PubMed PMID: 32601342; PubMed Central PMCID: PMC7655718.