

# BMB Active Site News

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## Message from our Department Head

Dear Alumni and Friends of the Department of Biochemistry and Molecular Biophysics,

I am very pleased to present to you the latest issue of “BMB Active Site News”. The department has undergone significant changes during the last two years. As I wrote in the previous newsletter, Dr. John Tomich retired in spring 2023 after more than 30 years of service in our department. We celebrated John’s distinguished career in September 2023 with an event attended by many former students and associates. John’s retirement marked a “low point” in the department size, as we were left with only 8 faculty members.



I am happy to report that the declining trend has been reversed with two new faculty members joining BMB: Drs. Shijiao Huang and Brandon Garcia. You can learn about Shijiao’s and Brandon’s research programs further in this newsletter. As our faculty team grows, we continue focusing on academic and research excellence. The number of undergraduate biochemistry majors has reached 140. We also mentor 25 graduate students in our Ph.D., M.S., and B.S./M.S. programs. You can read about our students’ research successes in two stories in this newsletter. Finally, last year, we received sad news about the passing of Dr. David Cox, one of our department’s “founding fathers”, who served as the Head of the Department of Biochemistry between 1973 and 1989. A short story about Dr. Cox’s lasting impact is included below.

Warmest greetings to all alumni and friends! If you happen to visit Manhattan, please remember to stop by.

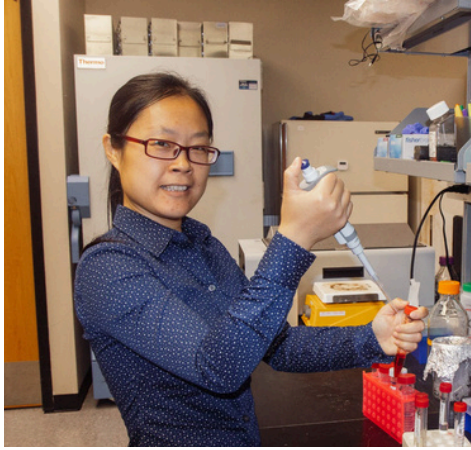
Michal Zolkiewski

## Ziwei Zhao Won Best Talk Award at Gordon Research Conference



Doctoral student Ziwei Zhao was selected to give an oral presentation at the 2025 Myogenesis Gordon Research Seminar near Lucca, Italy on June 7-8, 2025, where she won an award for best talk. She also presented a poster at the 2025 Myogenesis Gordon Research Conference held June 8-13. The title of her talk and poster were 'Pathogenic CryAB Mutations in Muscle Suggest a Novel Mechanism for Amyloid Secretion via Extracellular Vesicles.' Dr. Erika Geisbrecht, Professor of Biochemistry and Molecular Biophysics, is Ziwei’s Ph.D. advisor.

# The Huang Lab: Investigating Aging



Ever since high school, Dr. Shijiao Huang was fascinated by physics and dreamed of becoming a scientist like Marie Curie. In college, however, she discovered her strengths in biology, a field that was rapidly expanding in the early 2000s with many unanswered questions. This shift led her to pursue a Ph.D. and postdoctoral training, driven by her curiosity and desire to explore life sciences. During graduate school at Peking University, she studied the mechanisms that allow cells to survive, focusing on DNA replication and centrosome duplication in Dr. Chuanmao Zhang's lab. Wanting to move from the cellular to the organismal level, she decided to work with model organisms. Since childhood, Dr. Huang had dreamed of stopping aging, and she was

excited to learn that aging research became a growing field after the discovery of the first longevity gene in 1988. She joined Dr. Scott Leiser's lab at the University of Michigan to study how the nervous system regulates aging in the roundworm *C. elegans*, a model system well suited to aging research due to its simplicity and genetic tractability.

Today, Dr. Huang's lab studies how neurons and neural signaling regulate aging and age-related diseases. Her team takes a multi-pathway, multi-organism approach to uncover how conserved neuron circuits integrate environmental stressors and metabolic changes to influence stress resistance, lifespan, and healthspan. They use *C. elegans* for its short lifespan and powerful genetic tools to manipulate specific neurons and genes, and validate their findings in cultured human cells to explore relevance to human biology. The goal is to understand the fundamental mechanisms that allow the nervous system to influence longevity and resilience to age-related decline.



Looking forward, Dr. Huang's research aims to map the neuronal landscape of aging, identify central hub neurons in longevity circuits, and discover how genes and neural signals extend lifespan and healthspan. Since joining Kansas State University less than two years ago, she has built a dedicated lab team and established collaborative efforts across disciplines. With the global population aging rapidly—those aged 60+ now outnumbering children under five—there is an urgent need to combat age-related diseases. As the main causes of death have shifted from infectious diseases to chronic aging-related conditions, Dr. Huang's work seeks to uncover molecular targets that could lead to interventions for a longer, healthier life.

## Remembering David Cox



The department was saddened by the death of Professor Emeritus David J. Cox on October 14, 2024. Dr. Cox was hired as the department head in 1973 and departed to a deanship in 1989. He retired in 2000. At K-State, Dr. Cox hired half a dozen new faculty members, increased interactions with other departments and universities around the world, grew the graduate program, and oversaw a large increase of research funding. His own research program was at the cutting edge of studies on protein-protein interactions and physical methods to measure and simulate those interactions. Teaching was one of his favorite activities and he taught a portion of Biochemistry I, our major's course, during the first third of the fall semester at 7:30 a.m. most years. He also served well on a number of college-wide committees and the faculty senate.



# The Garcia Lab: Putting Lyme Disease in Focus

Dr. Brandon Garcia grew up in Kansas City and is a proud alumnus of the University of Missouri-Kansas City where he obtained B.S., M.S. and Ph.D. degrees. He has been happily married to his wife Cristee for 19 years and they both enjoy spending time with their 13-year-old son Max and 6-year-old daughter Sophie. Apollo, a six-month old golden doodle puppy, and recent addition to the family, has been keeping them all busy. They are all die-hard Kansas City Royals fans and make the short trip along I-70 to Kauffman stadium as often they can.



After receiving his Ph.D. from UMKC, Dr. Garcia performed his postdoctoral work first at Texas A&M Health Science Center in Houston before carrying out a second postdoc right here at KSU in the laboratory of Dr. Brian Geisbrecht. In 2018, after four fantastic years in Manhattan, he joined the faculty in the Department of Microbiology and Immunology at East Carolina University's Brody School of Medicine as an Assistant Professor before being promoted to an Associate Professor in 2024. In August of 2024, he relocated his laboratory back to Manhattan after being recruited to KSU as part of the Biomanufacturing Training and Education Initiative.



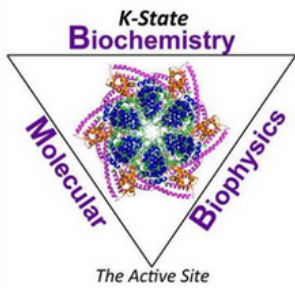
The Garcia lab investigates fundamental questions about the biology of the nation's leading vector-borne illness, Lyme disease. *Borrelia burgdorferi*, the causative agent of Lyme disease, is a tick-borne spirochete (bacterium) that is estimated to cause nearly 500,000 infections a year in the United States alone. Because most *B. burgdorferi* infections occur in otherwise healthy individuals, an important question the Garcia lab is addressing is how this notorious bacterial pathogen evades a fully functioning and potent human

immune system. The Garcia lab is currently using multiple structural biology approaches, biophysical techniques, and biochemical methods to interrogate molecular interactions that occur at the host-pathogen interface. A major focus of the laboratory currently is to reveal the molecular mechanisms that the Lyme disease spirochete uses to evade antibody-dependent complement-mediated destruction. The long-term goal of Dr. Garcia's research program is to elucidate the structure and function of the outer surface lipoproteome of the Lyme disease spirochete and understand at atomic resolution how these critical virulence determinants, diagnostic targets, and vaccine targets are genetically regulated.

## Huiquan Duan Awarded Sarachek Fellowship

Huiquan Duan, doctoral recipient, was awarded the \$19,000 Alvin and RosaLee Sarachek Predoctoral Honors Fellowship in Molecular Biology. Huiquan's research focused on mechanistic insights into inhibition of the complement system, which is a key component of innate immunity. Overactivation of complement or its activation under inappropriate contexts serves as a driving force in numerous autoimmune and inflammatory diseases. By characterizing naturally occurring and synthetic inhibitors of the complement system, Huiquan paved the way for designing newer, more effective, and lower-cost complement targeted therapies. Huiquan is now a postdoctoral researcher at the University of Pennsylvania, where he is continuing to research complement pathobiology and therapeutic interventions. Dr. Brian Geisbrecht, University Distinguished Professor of Biochemistry and Molecular Biophysics, served as Huiquan's major professor.





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