Dear All,

One of our fundamental missions is to prepare undergraduates who can compete for positions in a variety of post-graduate programs. To get into these programs, I can honestly say that our students work their tails off! This last year 14 of the graduates I spoke to during exit interviews were accepted to medical school, four were accepted into graduate science programs, and four more were accepted to veterinarian school! I had the personal joy of watching Alex Hall, who worked in my laboratory as a freshman, complete his degree, and matriculate into the OSU College of Osteopathic Medicine. In my opinion, Alex demonstrated one of the finest examples of "sticktoitiveness" I had ever seen. Another one of our recent graduates, Julia Sealock, went on to pursue a Ph.D. at Vanderbilt University. She stated that she chose to major in biochemistry and molecular biology, "because I wanted a robust and challenging education in the sciences." Considering that we produce ~ 30 bachelor degree recipients each year, the number of our students making it into postgraduate programs is a good indication that both our students and our teaching faculty are exceptional.

Since our last newsletter, the Department received an anonymous $15,000 donation, and with Professor Arlan Richardson's donation (on behalf of Dr. Franklin Leach), the "Undergraduate and Graduate Research Scholars Endowment in Biochemistry and Molecular Biology" is now officially endowed! This fund allows graduate and undergraduate students an opportunity to submit proposals that can be considered for research consumables and equipment, or to present their research at scientific meetings. These funds will provide our students a degree of early independence in the laboratory and help develop important grant writing skills. We all hope that the corpus of this fund continues to grow so that we can provide more opportunities to our students!

On the faculty front, our own Dr. Steve Hartson was awarded the 2016 Faculty Member University Service Award. Dr. Hartson almost always steps up whenever he is asked to, even when times are tough, and we are all so proud to have him in our faculty. Dr. Hartson received his B.S., Ph.D. and postdoctoral training in our Department and he consistently bleeds orange. I would also like to mention that Dr. Ellie Nguyen, who has not even been here a full year, has
already acquired an OCAST grant and we are all incredibly excited by this early success! I hope you enjoy reading in this newsletter about the additional faculty successes that contribute tremendously to building this Department.

A hearty Oklahoma thank you goes out to all of our alumni and donors, I hope that all your loved ones keep your hearts warm (thanks in part to metabolism of course....). Go Biochemistry and Molecular Biology Pokes!

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**STUDENT NEWS**

When I was a freshman, I chose to major in biochemistry and molecular biology because I wanted a robust and challenging education in the sciences. In the BMB department here at OSU, this is exactly what I found. My courses not only increased my knowledge in biochemistry but also taught me how to think like a scientist to solve problems. I found the degree program did not limit my education to one field – I had the freedom to take courses in other disciplines including genetics and pharmacology. This capability to personalize my education gave me a glimpse into other fields that ultimately informed my choice of graduate school. In the fall of 2017, I will be pursuing a PhD at Vanderbilt University in the Interdisciplinary Graduate Program.

The Interdisciplinary Graduate Program (IGP) encompasses eleven different departments shared between the School of Medicine and College of Arts & Sciences. One of the greatest strengths of the IGP is the flexibility it offers. New students have a semester of core coursework and a semester of electives to solidify their knowledge and explore specific interests before selecting a thesis advisor. This approach allows students to personalize their education to individual interests and career goals.

In addition to the classroom, I have worked in research labs for three out of my four years at Oklahoma State. These experiences showed me what a career in research looks like first-hand, increasing my excitement for the sciences and solidifying my career decision.

In the future, I hope to be conducting my own research focused on the genetics of neurodegenerative diseases and possible drug targets for treatment. I will always be thankful for my classes and experiences in the BMB department at Oklahoma State for preparing me graduate school and my career.
STUDENT NEWS

During enrollment for my freshman year of college at Oklahoma State, I chose to declare my major as biochemistry and molecular biology because of the pre-med option and the great resources and scholarship opportunities offered by CASNR. During my freshman orientation, I met Dr. Gustafson, the department head of biochemistry and molecular biology. He was very encouraging of my goals to ultimately attend medical school, so I later decided to request a position in his lab for my Freshman Research Scholars project. While working in that lab, I managed to learn a great deal about pathogenic microbes, aseptic technique, and general microbiology before I even took a college biology course. My early exposure to research and hands-on lab experience along with getting acquainted with faculty members provided a significant kick start to my undergraduate career.

From the very start, my faculty advisor, Dr. Canaan, was extremely supportive of my goal to pursue acceptance to the Early Admissions Program on the Rural Medical Track at Oklahoma State University College of Osteopathic Medicine. She helped me strategically plan my course load to hit the prerequisites for that program in an efficient manner. Thanks to her, enrolling was never a stress even though I was attempting to prepare for medical school in only three years. During my three years of undergraduate studies, I never once felt like I didn't have resources or support in my department.

Now, I am finishing up my first year as an osteopathic medical student at OSU-COM as an early admissions student on the rural medical track. It continues to be a wild ride, and I am incredibly thankful for the opportunities that have been placed in front of me. Entering medical school after only three years of undergraduate education has proven to be a rigorous journey all of its own, but the faculty and staff of OSU-COM have been amazing with helping me adjust. It has been and continues to be an undoubtedly difficult path thus far, but I do not regret a single choice I've made in my education. Three short years ago, I was moving to Stillwater as a bright-eyed incoming freshman from the small town of Bristow, Oklahoma, and in three short years I will be entering the residency match as an osteopathic physician. I intend to stay in Oklahoma to practice, and I hope to see our state's physician shortage dwindle in the coming years.
alongside state legislators to create and improve healthcare policies that affect rural Oklahoma.

I will always be grateful for my experiences as a Biochemistry student at OSU. Knowing I was able to earn such a difficult degree during undergrad has helped reassure me of my ability to succeed in the medical field."

"I was accepted into Oklahoma State College of Osteopathic Medicine and will begin classes on August 7th. I am very excited to be able to attend a medical school that puts a large focus on serving rural Oklahoma.

It has been a busy summer. I married my high school sweetheart, Asa Manship, in June and we just bought a house in Tulsa close to the medical school. As for my future plans, I am looking forward to becoming involved in the OSU-COM stORM club - which focuses on rural medicine. After graduating from medical school my plans are to become a rural physician and work

Carlee Luttrull, center, was awarded Best Graduate Poster from the Oklahoma Academy of Science OAS, November 2016. Pictured left, Dr. John Gustafson, Professor and Head; right, Dr. Donald Ruhl, Associate Professor and Academic Advisor.

BIMB student workers, Garret Boren, Regents Professor Robert Matts’ lab, and Woong Hee Cho, Professor Jose Soulages’ lab, were selected as Niblack Research Scholars for 2016-17.
STUDENT NEWS

BIMB STUDENT SUCCESS LEADERS for CASNR 2016-17

Students Helping Students

CASNR Student Success Leaders (SSLs) are diverse in classification, area of study, personal background and future ambitions. These students serve as peer educators, mentors and leaders for current and prospective CASNR students through five leadership groups. Throughout the year, SSLs participate in both preservice training and ongoing professional development to strengthen their competencies in communication, team building, goal-setting, servant leadership, conflict resolution and professionalism. They have in common the desire to serve. Individually and collectively these students add quality to our academic programs and to the lives of fellow students. Along the way, they learn valuable life and educational lessons. In addition to the service they provided their peers, this past year, our SSL teams completed 9,540 combined hours of community service.

AG 1011 Student Academic Mentors, or SAMS - BIMB participants are as follows: Hannah Carter-Sophomore, Stillwater OK; Briannon Crow-Sophomore, Fort Gibson OK; Micah Gillezeau-Senior, Amarillo TX; Aubrey Hicks-Junior, Colleyville TX; Kami Hogan-Sophomore, Lubbock TX; Kelli Perkins-Senior, Wildorado TX; Sean Quintana-Senior, Allen TX; John Schrader-Sophomore, Enid OK; William Shaffer-Senior, Carthage MO; and Megan Smith-Junior, Edmond OK.

CASNR Ambassadors - BIMB participants: Cory Bright -Senior, Tulsa OK; John Schrader-Sophomore, Enid OK

Freshman In Transition Academic Mentors, or FIT SAMs - BIMB participants are as follows: Sarah Stoll-Sophomore, Indiahoma, OK.

FOR INFORMATION ON BECOMING A CASNR STUDENT SUCCESS LEADER, CONTACT THE

CASNR STUDENT SUCCESS CENTER
103 Ag Hall
405.744.9464
casn르.okstate.edu
STUDENT ORGANIZATIONS

BIOCHEMISTRY CLUB - DELTA NU ALPHA
Front L-R: Kristy Johnson - Secretary; Kabryn Miller - Public Relations; Rachel Williams - Event Coordinator; Whitney Peterson - CASNR Representative; Breanna Jacobitz - CASNR Representative; Back L-R: Delton Hall - President; Brock Keen - Treasurer; Austin Hinds - Vice President

BMBGSA - BIOCHEMISTRY AND MOLECULAR BIOLOGY GRADUATE STUDENT ASSOCIATION
L-R: Sean Gile - GPSGA Representative; Victoria Kingdom Tabb - Secretary; William Johnson - Vice President; Lawrie Gainey - President; Alexander Lim - Treasurer; Matthew Greenlee - GPSGA Representative
Nguyen was awarded an OCAST grant in June 2017, entitled “The molecular mechanism of herbivory Defense regulation by SRFR1 in the Arabidopsis thaliana to Spodotera Exigua and Pieris rapae hervivores.”

Summary: During their lifetime, plants encounter a variety of Pathogenic microbes and pests. To survive, they have developed diverse mechanisms to fine-tune defense responses to different types of enemies. Cross-regulation between plant signaling pathways may allow the plant to prioritize one response over the other. The overall goal of this project is to analyze the cross-regulation between different signaling pathways that allow prioritization of one response over others. Our long term goal is to investigate the effects of mutating SRFR1 on the yield and resistance of food crops to determine whether decreasing expression of this regulator could be an asset in pest control.

Dr. “Ellie” Dung Nguyen, Assistant Professor and Academic Advisor

Dr. Rita Miller, Associate Professor and Dr. Charles Chen, Assistant Professor and Bioinformatics Faculty, were awarded 2 Sitlington Enriched Graduate Scholarships titled “Regulation of Environmental Stress by SUMO in Wheat”. One of the primary objectives of this program is to recruit outstanding doctoral students to the College of Agricultural Sciences and Natural Resources (CASNR.)
FACULTY NEWS

Through the NSF, a major research instrumentation (MRI) award ($250,000) was made to OSU to acquire an Illumina NextSeq500 genomic sequencer. Dr. Peter Hoyt, BMB Director, Bioinformatics Graduate

Certificate Program & Genomics Core Facility, was PI, along with co-PIs Dr. Charles Chen, BMB Assistant Professor, Dr. Mark Fishbein, Dr. Andrew Doust, and Dr. Ronald Van Den Bussche. The NextSeq500 is a high-throughput sequencing machine capable of generating up to 120 billion bp of sequence data per run, which is the largest publicly-owned genome sequencer in the state. The NextSeq has one of the lowest per-base sequencing costs, has excellent data quality, and sufficient capacity to handle the anticipated total usage at OSU (recent poll estimate is 39 billion bp per week). This instrument has the capacity needed for eukaryotic de novo genome sequencing, RNA-seq experiments, metagenomic experiments, epigenetic analyses, and other modern high-throughput data experiments at low cost and rapid turnaround. Flow cells are available in configurations for high output and mid output. Each flow cell type is kitted with a compatible prefilled reagent cartridge. Real-Time Analysis (RTA) is integrated analysis software performs on-instrument data analysis, which includes image analysis and base calling. Through generous matching funds from the VPR office at OSU, the grant also includes three years of service contracts, a dedicated UPS, IBM 1.5TB Ultrium LTO-5 Data Cartridges to store up to 1.5 Pb of data. Access to this instrument will strengthen research, research training, collaborations, and outreach across multiple interdisciplinary programs at Oklahoma State University.

Dr. Peter Hoyt, Director, Bioinformatics Graduate Certificate Program & Genomics Core Facility, submitted a grant entitled: “Sample Preparation Robotics, with Thermal Cycler to Support High-Throughput Sequencing (Includes Quality Assessment Equipment)”, to the OSU VPR’s Facility Renovation and Core Facility program which has been recommended for funding ($122,363).

Dr. Hoyt continues to bring novel technology to the shores of our Department!
post-transcriptional level. Comparative profiles of miRNAs and their mRNA targets in these genotypes should offer insights into miRNA-dependent post-transcriptional gene regulations that are different in Pokkali compared to salt-sensitive IR29. The results could also provide leads about which miRNAs or miRNA targets could help make salt-sensitive rice to more salt-tolerant.

2). Proposal title: Characterizing the role of Serotonin in Abiotic Stress Responses of Rice.

In an effort to identify one metabolic basis of salt tolerance in rice, we compared metabolic profiles between salt-tolerant Pokkali and salt-sensitive IR29. The results revealed a remarkable increase in serotonin accumulation under salinity in Pokkali, which in turn formed the basis for the current proposal that has been funded by the NIFA. The underlying hypothesis for this proposal is that serotonin accumulation correlates with stress tolerance, and accumulates in tolerant genotypes. By determining serotonin levels in known stress-tolerant and stress-sensitive genotypes, this proposal will determine the extent to which tolerance to diverse abiotic stresses such as drought, flooding, and heat correlates with increased serotonin accumulation.
FACULTY NEWS

Dr. Junpeng Deng, Professor, Dr. Robert Matts, Regents Professor, and Dr. Steve Hartson, Associate Research Scientist, Director, DNA Sequencing, Mass Spectrometry and Core Facility

Deng, Matts, and Hartson were featured in the Winter/Spring 2017 issue of CASNR’s Cowboy Journal in an article titled, “Cancer Drug Design,” in which the trio of Biochemistry and Molecular Biology scientists tell us about their research toward a cure for cancer. (According to The World Health Organization, Cancer is the second leading cause of death globally, and was responsible for 8.8 million deaths in 2015.) To read the article in it’s entirety copy and paste the following link: https://issuu.com/cowboy.journal/docs/v19n1_lowres. To see the video, copy and paste the following link: https://www.facebook.com/OSUDASNR/videos/1277194159003111.

Dr. Steve Hartson, Associate Research Scientist, Director, DNA Sequencing, Mass Spectrometry and Core Facility, Henry Bellmon Research Center

Congratulations to Dr. Hartson who was awarded The 2016 Faculty Member University Service Award. This award is designed to recognize those who have rendered meritorious service to the university. In Dr. Hartson’s case, it is clear that the proteomics and DNA sequencing facility that he runs with his exceptional staff is enhancing the lives of researchers across our extended campus and regional area. His own research program is also having a profound impact on our institution and his discipline.
Dr. Aron W. Fenton - 1999 BMB Alumnus

I began my research career as an undergraduate in the Department of Biochemistry and Molecular Biology at Oklahoma State University. During this time I actually shared authorship on 4 publications with Professors George Odell and Charlotte Ownby on various aspects of venom biology. I then began my Ph.D. work in the Department with Professor and Department Head James Blair, which I completed in 1999. In addition to learning technique, Dr. Blair taught me how to be a scientist. In fact, I was amazed and humbled by the extra steps Dr. Blair took to ensure that I was well-trained and prepared for a career in the sciences. After graduating from OSU, I joined the laboratory of Dr. Gregory Reinhart at Texas A&M University as a postdoctoral fellow and stayed there to the end of 2003. With more of a molecular biology background, I entered Dr. Reinhart’s lab with a “jump in and start swimming” attitude and that was important in order for me to learn Dr. Reinhart’s thermodynamic theories utilized to evaluate allosteric systems. I also thank Dr. Reinhart for teaching me the confidence to approach and learn how to use almost any technique; many techniques that I use today are a result of Dr. Reinhart’s influence. Therefore, when I started my independent laboratory at the University of Kansas Medical Center in 2004, I began with a broad background that stretched from molecular biology to biophysical approaches. That broad background has served me well as I continue to focus on very detailed questions associated with understanding molecular mechanisms of allosteric regulation in proteins. Since entering academia, I have: obtained NIH R01 research grants, i.e., the “gold standard”; edited one book by invitation; and had a paper recognized by the Faculty of 1000 Prime. I am also a member of a team awarded the highly prized W.M. Keck Foundation Award. Recently, I was also awarded two additional NIH R01 research grants and our Department’s graduate students voted me the Outstanding Instructor in 2010-2011.

My interest in science outreach stems back to my roots growing up on an Oklahoma farm. Despite my one story that a registered herd of Herefords brought me to science, that background in a rural setting made me realize that if young students don’t know life science careers are out there, then they won’t be able to decide if those careers are worth pursuing. I therefore view my outreach efforts to undergraduate and high school students that provide hands-on research opportunities to these students as some of my most meaningful service duties. Presently, I coordinate the Heartland Undergraduate Biochemistry (HUB) Forum, which allows faculty from my department the opportunity to provide lectures to undergraduate students on 20 undergraduate campuses throughout the great Kansas City region. I’ve also directly sponsored more than 40 undergraduate researchers in my laboratory. In addition to undergraduate outreach, I work with
the biotech/life science specialty programs in four of the high schools in the Kansas City area. “Four school systems” doesn’t sound too impressive unless I point out that those four school systems include 106,000 K-12 students! This year we developed the Tom Steadman Teaching Opportunity named after an Oklahoma native and designed to allow high school teachers into laboratory research experiences.

As a final note, every OSU alumni I chat with asks me how my time at Texas A&M and at the University of Kansas Medical Center has influenced my commitment to OSU. Along the lines of actions over words, my two oldest children both graduated from OSU with their chemical engineering degree. My second son, third child is currently an OSU student. My youngest two daughters have full intentions of going to OSU. ..........and don't cut me, orange blood stains don't come out!

Barry Pollard, MD - 2017 OSU Hall of Fame Inductee

The OSU Hall of Fame is the highest honor bestowed by the university. In February of 2017, Dr. Barry Pollard was one of four selected for this prestigious award recognizing a lifetime of achievement in society and professional life.

While at OSU, Pollard was named a Top Ten Freshman and was a member of FarmHouse fraternity. Pollard graduated with a degree in Biochemistry in 1973. After completing medical school, he started a neurosurgery practice in Enid in 1982. Pollard has performed more than 17,000 cranial and spinal surgical procedures and believes his best professional accomplishment is “having the opportunity to take care of so many people with spinal and neurological problems.

In 1984, Pollard started P&K Equipment, a John Deere dealership in Kingfisher, Oklahoma, that has expanded to 10 locations across Oklahoma and nine dealership locations in Iowa. P&K employs more than 550 people.

Pollard served as chairman of the OSU Foundation Board of Trustees from 2009 to 2011 during the Branding Success campaign. He founded the OSU Medical Cowboy Scholarship, which has raised more than $3.7 Million for students interested in careers in medicine.

Pollard and his wife, Roxanne, have five children and seven grandchildren. He says his greatest personal success is his pride in his children’s character and their accomplishments. Pollard is a life member of the OSU Alumni Association.
Spring and Summer 2017 Graduates
Department of Biochemistry and Molecular Biology

Undergraduates

- Kristina Delane Baker
- Suzi Mariela Gi Barboza-Pacheco
- Kavya Boyina
- Cory Andrew Bright
- Blake Alexandra Bulard
- Mariah Lynn Burris
- Emily Killingsworth Cook
- Carissa Ann Davis
- Danielle Rae Dockrey
- Ian Andrew Fladie
- Zackery Logan Gene Fowler
- Alexander Blaine Hall
- Ashton Hunter Hierholzer
- Taylor Marie Kennedy
- Katie Marie King
- Emily Kathlyn Koetting
- Dominic Pierre Martin
- Megan Rose Martinez
- Cameron Lee McMahen
- Colton Paul Mitchell
- Katharine R. Nichols
- Kelli Layne Perkins
- Susan Nguyen Pham
- John Wayne Pickard
- Hannah Marie Pitts
- Sydney Lee Prendergast
- Sean Patrick Quintana
- Kory Shane Rockhold
- Kacey J. Rogers
- Paige Nichole Sanders
- Taylor Michael Schooling
- Cameron James Sutherland
- Carly Walker Suttle
- Heather Raye Taylor
- Justin Makai Tom
- Mason Willis Two Crow
- Friendly Gaohli Yang
- Morgan Kalib Youngblood
- Link H. Zheng
- Beata Louise Mackenroth

Doctoral

- Robert Pokoo
MORE MEMORIES OF JIM BLAIR

Jim embraced the Department’s culture of devotion to its teaching mission, and he put his own stamp upon it. Early in his time as Head, he raised funds to replace the aging equipment in the teaching lab with modern instruments: pH meters, balances, and diode-array spectrophotometers, and also to equip the department’s reading room with a bank of computers for students. He believed that undergraduates need to do science as well as study it. Under his leadership, Earl Mitchell and Franklin Leach instituted a research course for first-semester undergraduates in which they learned about the fundamentals and culture of scientific research as they gathered bacterial samples from their environment (telephones, food, bathrooms, etc.) and tested them for resistance to antibiotics. Jim won a series of Howard Hughes grants, one of which he used to develop modules of equipment for basic science experiments that were sent to 2-year colleges around the state. After Earl Mitchell won an NSF grant for minority participation in science, Jim used the department’s share of the indirect costs from that grant to support undergraduates in summer research projects in the department. Some of the undergraduates who worked in these programs entered our graduate program.

BMB Professors Emeriti,
Margaret Essenberg, Sharon Ford & Earl Mitchell