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### KU<sup>BIOLOGICAL</sup> Sciences

The BioHawk is published annually for alumni and friends of the University of Kansas Biological Sciences.

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**Dr. Lena Hileman** Chair, Ecology and Evolutionary Biology



**Dr. Scott Hefty** Chair, Molecular Biosciences



**Dr. Brian Ackley** Co-Director, Undergraduate Biology Program

### LETTER FROM THE CHAIRS

Welcome to the 2024 issue of the BioHawk – the KU Biology Newsletter! The BioHawk is our way to update you on all the things happening in the Biology units at KU – the Departments of Ecology & Evolutionary Biology and Molecular Biosciences, and the Undergraduate Biology Program. The last year has been a fantastic year for Biology at KU. As KU's enrollment has climbed ever higher, we too have seen an increase in students pursuing biology. As of the fall of 2024, we have almost 1800 (!) students choosing to pursue their degree in one of our 11 available undergraduate majors. This undertaking is only possible because of the efforts of our dedicated faculty, staff, and students. Below we will let you know about the changes going on here and celebrate the many accomplishments and awards of the past year.

In the last year, the Molecular Biosciences department was happy to welcome four new faculty members to the department: Dr. Emily Beck works on how variation in mitochondria manifest in populations, and how those changes influence the function of these critical organelles; Dr. Hans Dalton is working to understand how rare diseases manifest, while also using sensitive pharmacological screens to identify potential therapeutics; Dr. Allie Graham studies how organisms live in low oxygen environments, taking a genomics level view to integrate many different possible adaptations; and Dr. Coral Zhou is interested in understanding how nuclei inside cells organize the genome during development. The Ecology and Evolutionary Biology department was happy to welcome two new faculty members: Dr. Jennifer Johnson studies how plants respond physiologically to global climate change; and Dr. Katya Mack investigates how mammals adapt to diverse and extreme environments by focusing on changes in gene expression. We welcome these new faculty and are excited to see what they and their students learn as their research programs grow. Last year we said goodbye to a former faculty member, Dr. Jack Brown, who passed away in October. He will be missed by colleagues and the many students whose lives he touched while at KU. We gave our heart-felt thanks to Dr. Helen Alexander and Dr. James Thorp for their excellent contributions to teaching and research at KU. Both begin their next adventures in retirement, and we wish them the very best.

The graduate programs in the Ecology & Evolutionary Biology and Molecular Biosciences Departments remain as strong as ever. Three of our students Kevin Mulcahy (EEB), Maria Stoilova (EEB), and Macie Proctor-Roser (MB) were selected for the prestigious Self Graduate Fellowship! And three EEB students received National Science Foundation Graduate Research Fellowships (Martel Ellis, Vic Secondine and Dorothea Summers). Many other students were awarded travel awards or chosen for recognition for their research and teaching. Our award-winning students continue forging new research directions and sharing their successes through peer-reviewed publications and presentations at national and international meetings. We take pride in the diversity and remarkable accomplishments of our protégés!

The accomplishments of our fellow faculty members are no less impressive. Our faculty members routinely make discoveries that advance our understanding of the natural world. Here are some accomplishments of special note. Dr. Jamie Walters returned from a Fulbright-funded Sabbatical in the Czek Republic where he studied the evolution of butterfly chromosomes, and Dr. Rafe Brown received a Fulbright award to head off next year to the Philippines where he will continue his studies of island biodiversity. Drs. Bruce Lieberman and Town Peterson published books that make biodiversity concepts more accessible. *Macroevolutionaries* (Lieberman) summarizes many theories of speciation and extinction in the fossil record while *One Hundred and Fifty Years of Change on the* 



**Dr. Robert Moyle** Co-Director, Undergraduate Biology Program

*Great Plains* (Peterson) reveals startling changes to the plains landscape from repeat photography. Dr. Joanna Slusky published a comprehensive analysis of bacterial proteins central to antibiotic resistance. Dr. Erik Lundquist characterized a key regulator associated with both neural and cancer development. Dr. Tony Fehr developed a new compound that inhibits coronavirus replication. Dr. Brian Ackley discovered an novel mechanism associated with Alzheimer's progression.

Most impressive are the *many* biology professors who recently won teaching awards in recognition of their excellence and innovation in the classroom! These include Dr. Dyan Morgan and Dr. Trevor Rivers who received the Bob & Kathie Taylor Excellence in Teaching Awards in 2024 and 2023, respectively, Dr. Jennifer Gleason who won the 2024 Ned Fleming Trust Award for Excellence in Teaching, and Dr. Jenny Archibald who received a 2024 William T. Kemper Fellowship for Teaching Excellence.

Please read along, and enjoy highlights of the remarkable things our students, staff, and faculty have done this year. We hope you too are celebrating your successes, and we are always delighted for you to share them with us. Get in touch, let us know what is new, or reminisce about your time at KU. We all thank you for your continued support of our work, which helps us foster a vibrant and dynamic educational environment where students can thrive and be prepared for the next stages of their lives.

Rock Chalk! Lena, Scott, Brian, Rob





### UNDERGRADUATE

#### CHANGES IN THE UNDERGRADUATE BIOLOGY PROGRAM

The 2023/2024 school year brought with it a recordbreaking class of 5,259 new Jayhawks, of which 463 joined the Undergraduate Biology Program, bringing the total population of Biology students to 1,631. 164 participated in Undergraduate Research and 73 took part in Study Abroad programs. This large class of students introduced new joys and challenges to our program, but our dedication and hardworking faculty and staff helped propel students to the great heights that only KU can offer.

Last year brought other changes to Undergraduate Biology, with the promotion of previous co-directors Dr. Scott Hefty to Chair of Molecular Biosciences, and Dr. Mark Mort to Associate Director at the Center for Teaching Excellence. We are pleased to have two new co-directors, Dr. Brian Ackley, Associate Professor in Molecular Biosciences, and Dr. Rob Moyle, Professor in Ecology & Evolutionary Biology. Of our preexisting Faculty, Dr. Dyan Morgan and Dr. Victor H. Gonzalez received a well-deserved promotion to Associate Teaching Professor in the fall of 2023.

Student advising has shifted toward a new model, and our team has grown under Jayhawk Academic Advising's wing. We now have ten advisors who provide our students with guidance throughout their college careers.

The two Biology Departments and the Undergraduate Program have also hired 9 new faculty and staff in the past year, Dr. Rachel Bechtold, Dr. Dan Ruffing, Dr. Jennifer Johnson, Dr. Katya Mack, Dr. Hans Dalton, Dr. Allie Graham, Dr. Emily Beck, Laura Maloney and Nicole Succhy. All of these fantastic, innovative teachers. We are happy to welcome them to our programs.



#### WONDROUS WELCOME

Despite the extreme heat, the 2023/2024 Academic year started with gusto on August 20th, 2023, with the second annual Biology Welcome Event. This Hawk Week event was held on Academic Sunday, and helped introduce incoming freshmen to their Biology Faculty, classrooms, labs spaces, and fellow students by hosting a number of biology themed games and challenges at Haworth Hall.

Students were given a 'Lab Notes' booklet detailing instructions for the Scavenger Huntbased challenge and were sent to complete a number of stations where they could meet Faculty, Staff, Academic Advisors, plus Graduate and Undergraduate Teaching Assistants.

Each scavenger hunt station completed by a student earned them a stamp and the games promoted collaboration between students. In addition to Study Abroad highlights, Biology Student Organizations, and Biology Wordle, three new stations were added to the mix, Would You Rather, Duck Pond Trivia and Biology Movie Match! There are now eight different biology themed stations for students to choose from, and those who completed their 'Lab



Notes' were rewarded with a KU Biology T-shirt!

Overall, the Biology Welcome Event was a huge success, with an immense turnout of 356 student attendees. One anonymous student reviewer said, "I really liked how immersive it was. The scavenger hunt was very entertaining, and I actually learned a lot of useful information about my major."

The Welcome Event was developed and organized by Undergraduate Biology Staff, Lauren Spain-Eddington, Lindsey Deaver, Maria Losito, Bridgette Beck-Kells, and Julia Radley. They were assisted by 30 faculty & staff volunteers and joined by eight student organizations.

### BIOLOGY PROGRAM



# BUILDING COMMUNITY

The Welcome Event was just the start of the community building events put on in Haworth. Last academic year, the Undergraduate Biology Program sponsored a total of twelve in-building events, ranging from the Biology Open House during KU's Family Weekend, to the new Biology Jeopardy in the spring. We also had an Alumni Tailgate outside of the Natural History Museum where students and alumni got to hang out with their friends, family, and faculty prior to the KU/OU football game.







(TOP) BIOLOGY ALUMNI TAILGATE ATTENDEES OUTSIDE OF DYCHE HALL

(BOTTOM LEFT) STUDENTS ATTENDING COFFEE & CHROMOSOMES

(BOTTOM RIGHT) DR. EILEEN HOTZE & ANASUYA SUBRAMANIAM AT BIOLOGY JEOPARDY

#### Event List of Fall '23 Spring '24:

Undergraduate Biology Welcome Event, Biology Open House: KU Family Weekend, Biology Alumni Homecoming Tailgate, Crimson & Blue Day, Finals Week Hot Cocoa, Puzzle Break, Biology's Winter Welcome, Smaug's first day with Biology, Three Coffee & Chromosomes Events, Rock'em Chalk'em March Madness, Biology Jeopardy, ARTnatomy, Undergraduate Biology Program Honors Symposium, Undergraduate Biology Recognition Ceremony.

# STUDENT LED CHANGE

The Biology Majors Advisory Committee (BMAC) is a group of eight undergraduate students that represent the KU biology student body to provide feedback and ideas to the biology programs. Members of the BMAC provide weekly feedback hours where students stop by to provide thoughts on their experiences. They are currently working with the departments on a variety of questions, including improvements in physical space in Haworth, possible changes to the Human Biology degree, and ideas for events that Undergraduate Biology could host.

Their feedback is invaluable to our departments and has so far resulted in new events for undergraduates, including Coffee and Chromosomes—a meet-and-greet coffee hour between students and professors. They also advocated for new furniture in Haworth, resulting in the addition of several couches in the lobby of Haworth Hall.



(TOP) 2023-2024 BIOLOGY MAJORS ADVISORY COMMITTEE MEMBERS. PICTURED FROM LEFT TO RIGHT, TOP ROW TO BOTTOM ROW: RYLEE CROWELL, CHRISTIAN DECKER, SAMSON MAH, ROBERT MENNING, JASON MESCHKE, XAVIER MURRAY, CLAIRE PATTERSON, AND ARMINA RAHEEL

(RIGHT) A NEW STUDY NOOK FEATURING ONE OF THE NEW COUCHES AND ART FROM ARTNATOMY.





# STUDY ABROAD

In January 2024, five students (Grace Freidrichs, Dorothy Haggard, Mackenna Harris, Kaden Miller, and Katherine Welch) spent a week in Roatan, Honduras, for a Marine Biology Study Abroad course. This course, led by Associate Teaching Professor Trevor Rivers, is one of only two faculty-led biology-based study abroad courses offered by KU. During this week, students observed and identified over 200 species of marine organisms, learned about coral restoration efforts, and participated in helping clean a coral nursery. In 2025, nine students will be returning to Roatan to continue where we left off.





#### EUROPEAN TOUR IN MEDICINE

In May 2024, sixteen students traveled to Switzerland, Germany, France, Netherlands, and England during a 3-week course focused on learning about scientific challenges and career pathways associated with diverse biomedical science entities, as well as a stronger appreciation for the similarities and differences in public health systems in these countries and ours. The students were led by Dr. Scott Hefty (Professor and Chairperson, Molecular Biosciences) and visited 17 scientific sites that included the World Health Organization, Hoffman La-Roche, French National Institutes of Health, and the Jenner Institute. The students also visited many cultural sites that included the Rijksmuseum, Louvre, and tour of London. Twenty-nine students have submitted applications for a similar course scheduled during 2025 spring break and in Italy!







In 2025, Biology will be facilitating two study abroad trips, Marine Biology in Roatan over winter break and Biomedical Sciences and Public Health in Italy this spring.

# STUDENT RESEARCH



ALEXA MAGSTADT is studying Molecular, Cellular, and Developmental Biology with a minor in Spanish. She is part of the Chancellors Club Scholar, a BioScholar & an Undergraduate Research Assistant in the Dixon Lab.

"I work with a small molecule inhibitor that was newly developed to treat cancer with mutations in a protein called KRAS or Kirsten rat sarcoma. KRAS was previously considered undruggable and it's really hard to treat. They recently developed this inhibitor that's able to target this protein specifically, and they've shown a lot of really great results in pancreatic cancer but its treatment implications in colorectal cancer have not really been explored. So, I've been working to figure out how we can adapt this inhibitor for colon cancer."

ANNA FERKUL majored in Microbology and minored in Psycology. She graduated in Spring 2024.

"I study HSV-1[in the Davido Lab], which is a really common virus that causes cold sores. There's estimated to be 3.7 billion people worldwide that have it. I study host proteins called PARPs and I'm trying to see how HSV-1 replicates in the presence and absence of these PARPs.



Recently we've had some really cool findings in the research that I've been doing. I have three different cell lines, one of them has PARP14, the host proteins, then two of them are knockout so they don't have the PARPs proteins. We found that in the cells that don't have the PARP14 proteins that HSV-1 can replicate much better and we see a lot higher titers in those cells. Now we're going to try to figure out what exactly in the PARPs are affecting viral replication."



NATALIE HERBISON majored in Ecology, Evolutionary and Organismal Biology & Environmental Studies and graduated in the Spring of 2024. She took part in an National Science Foundation REU program on pollinators and climate change led by Dr. Victor Gonzalez.

"We specifically looked at how different factors may influence bees' physiological responses to changing climate, particularly to temperature increases. A lot of what we did was thermal experimentation that measured what the Critical Thermal Maximum temperature the bees could withstand was under given conditions, like if they had been fed or not, put through an acclimation period, or if they were exposed to heat stress before experimentation. We also looked at Time to Heat Stupor for honeybees and some Halictid bees, which is essentially how long can bees be exposed to high temperatures before they lose metabolic control and shut down."

KAITLYN 'KIT' SAVOY is a Biology major minoring in Chemistry & Theater. She won the 2024 Goldwater Scholarship and does research with the Sikes Lab.

"On a big scale, I'm exploring how microbes move and survive in space. Microbes are really important for human health, so understanding how they behave is important to maintain people's well-being. Since space conditions are a lot different than Earth conditions microbes probably behave differently in space than on Earth and to keep people healthy in space, since we keep sending them there, it's important to understand how microbes behave in space. On a smaller scale, right now, that looks like determining whether fungal spores can be dispersed by electric fields. So really, what it means is that I'm electrocuting spores!"



### REU at KU THE STRESSED LIFE OF CELLS

This summer, the University of Kansas Department of Molecular Biosciences wrapped up another fantastic Research Experience for Undergraduates (REU) program, bringing twelve bright students from colleges and universities across the country to the University of Kansas. From May 20 to July 26, these students made KU Residence Halls their home, forging friendships and soaking up the charms of Lawrence and Kansas.

During the day, they rolled up their sleeves to dive into some exciting research in fields like genetics, structural biology, developmental biology, molecular biology, and microbiology. With guidance from dedicated faculty in Molecular Biosciences and Ecology & Evolutionary Biology, they gained essential skills to prepare for future careers in academia and industry. Tours of local industries and research facilities, including the KU Innovation Park and KU Core Facilities, offered unique experiences for the participants and chances to connect with seasoned scientists. The summer was capped off with an awards banquet, celebrating their hard work and accomplishments!

This program, led by Dr. Lisa Timmons and supported by the National Science Foundation (NSF), aims to provide top-tier research opportunities to students who may not have access to such opportunities in their home institutions. The success of this NSF-funded initiative highlights the KU's commitment to fostering the next generation of scientific leaders. We're excited to welcome a new group of eager students next summer! If you know someone interested in joining us, they can find more details and apply at mb-reu.ku.edu.



#### NEW ROOTS FOR RESTORATION BIOLOGY

This summer, the University of Kansas Department of Ecology and Evolutionary Biology and Kansas Biological Survey hosted a number of students from colleges across the country. This National Science Foundation funded initiative had the overarching goal of learning how plant roots and shoots relate to one another and how those relationships influence and are in turn influenced by plant communities and the soil ecosphere. From May 28 to August 2, 2024, REU students worked along KU faculty and explored the stunning ecosystems at the University of Kansas Field Station!

While taking part in the REU, students conducted experiments on Eastern gamagrass, a wild perennial relative of corn, and investigated genetic diversity within plant species affected by interactions with root-associated microbes. Projects included comparing the effects of different soil microbiomes on root and shoot characteristics; and measuring the abundance and metabolic activity of microbes colonizing the roots of diverse Eastern gamagrass genotypes.

The program was led by Dr. Maggie Wagner, Dr. Ben Sikes, and Dr. Jim Bever.



### SOCIAL MEDIA HIGHLIGHTS SMAUG JOINS KU BIO!

Smaug Scott Beck-Kells joined the Undergraduate Biology team in January 2024 at just 5 months old. Although native to Australia, Smaug was born just down the hill at Pet World here in Lawrence. Once fully grown, which happens around 18 months, bearded dragons are approximately 18-22 inches long and weigh about 3/4lb. Smaug's diet consists of daily greens and vegetables (bell peppers are his favorite) and different protein a few times a week. During the winter months, Smaug will be a little more sluggish than usual as bearded dragons go into brumation (the reptile version of hibernation) so don't worry if you don't see him during this time... he's probably snoozing behind his rock.

On a personal level, Smaug exudes that strong Leo energy (his birthday is August 9th). He loves to have admirers visit him in the biology office and is always down to celebrate those big moments like graduation and Halloween with an epic costume! Don't let his expert-level side eye fool you, Smaug is incredibly calm and has a very happy disposition. During school breaks when campus is closed, Smaug vacations at his mom's, biology advisor Bridgette Beck-Kells, house and enjoys cuddling with his 3 pug siblings.







#### GREENHOUSE STUDY SPACE

The Haworth Greenhouse recently received a facelift, courtesy of Dan Ruffing, Greenhouse Manager, with the inclusion of a new study space! This huge change not only impacted students by allowing them more access to the greenhouses, but it also helped alleviate the lack of study and rest space within Haworth. In the past few years, we have worked to improve this shortfall by creating a study space, the BioCenter for Collaborative Learning, as well as funding six new couches that were placed on the first and second floors. In the future, we hope to be able to fund an outdoor seating area. BioHawk 11

#### FACULTY IN FOCUS NEW FACULTY JENNIFER ARCHIBALD

RACHEL BECHTOLD (Multi-term Lecturer) joined the Undergraduate Biology Department in Fall 2024. Dr. Bechtold received her Ph.D. in Environmental Dynamics from the University of Arkansas in Fayetteville, AR. During graduate

school, Dr. Bechtold studied rehabilitation methodologies for degraded mined lands by means of bacterial and phytoremediation techniques. Previously, she taught environmental health, disease vector control, and toxicology. She has interest in spillover events between the natural environment and human populations and recently cocreated a class, leading a student trip to Costa Rica to observe these dynamics in action. She was inspired to do so as a well-



traveled polyglot with experience in AmeriCorps, Peace Corps, and Rotary Exchange. Dr. Bechtold has been awarded a grant from the Center for Teaching Excellence to build schema theory in the introductory cellular and molecular biology course as a novel way of interacting with large lecture hall classes and to enhance the student experience.

#### GRANTS, AWARDS, & PUBLICATION

TREVOR RIVERS (Associate Teaching Professor) in the Department of Ecology & Evolutionary Biology and Undergraduate Biology Program, has been named the winner of the 2023 Bob & Kathie Taylor Excellence in Teaching Award, which career/specialty recognizes faculty.



(Associate Teaching Professor) won the William T. Kemper Fellowship for Teaching Excellence in 2024. The award recognizes outstanding KU faculty whose innovative approaches to teaching help students gain crucial skills, embrace academic and professional challenges, develop learning strategies and improve long-term student success.



Archibald has been heralded for her excellence as an instructor in the high-enrollment Principles of Organismal Biology course (BIOL 152) which is required of all biology majors. Outside the classroom, she has integrated multiple opportunities for students to participate in communitybased learning at Baker Wetlands, has partnered with the Spencer Museum of Art to introduce students to the "Art of Biology" and has spearheaded the Botany Club at KU.

EILEEN HOTZE (Associate Teaching Professor) was awarded a Kansas IDeA Network Biomedical of Research Excellence (K-INBRE) for a CURE award. Onemission of the NIH-funded K-INBRE grant is to increase research activities using the classroom. These activities are referred to as Curriculumbased Undergraduate Research Experiences (CURE) and student should increase



participation in research and enhance faculty efforts in conducting NIH-related biomedical research. Dr. Hotze's CURE award is for the Bacterial Infectious Disease Lab and is expanding on work from Dr. Rosana Ferreira's lab to identify skin microbiome isolates that can impact biofilm formation on Staphylococcus aureus.

VICTOR GONZALEZ (Associate Teaching Professor) published a new study on bees' physiological response to extreme temperatures which revealed that bees have limited capacity to enhance their heat tolerance via acclimation or prior heat exposure making them vulnerable to climate change.

The research team, led by Gonzalez, studied six wild bee species from the Greek Island



of Lesvos by measuring changes in their heat tolerance in response to elevated temperatures and simulated heat waves. The study involved capturing live specimens in the field and conducting thermal experiments in the lab. The team discovered that bees were sensitive to the change in temperature and exhibited limited capacity to increase their heat tolerance.



### STUDENT AWARDS & HONORS

#### BIOLOGY HONORS RECOGNITION CEREMONY

Graduates receiving Departmental Honors in Biology go above and beyond what is required for their degree. They complete additional coursework, conduct research with a faculty mentor, write a thesis, and present this thesis to a panel of faculty for review. *The following students earned departmental honors in May 2024:* 

**CHRISTIAN DECKER** (mentor: Dr. Lynn Hancock) *E. faecalis* carbohydrate transport regulation in rpoN

KARA HOOSER (mentor: Dr. Maggie Wagner) Title: The effects of drought, microbes, and genotypic diversity

JANIE RAINER (mentor: Dr. Lynn Hancock) Title: Identifying the YesN regulon of *Enterococcus faecalis* 

**CAILIN KESSEN** (mentor: Dr. Jamie Walters) Title: Sexbiased longevity in Lepidoptera using *Plodia interpunctella* as a model system **ROBERT MENNING** (mentor: Dr. Jim Bever) Title: Evolution of reduced response to mycorrhizal fungi during Milkweed colonization of post-ag fields

ALBERT PARK (mentor: Dr. Heng Du) Title: The role of 17-AAG, an HSP90 Inhibitor, in Alzheimer's Disease

VIVIAN MARSHALL (mentor: Dr. Ray Pierotti) Title: The responses of budgerigars to different emotional states

**LAIBA ASHRAF** (mentor: Dr. Brian Ackley) Title: Using *C. elegans* as a model for Familial Alzheimer's Disease (FAD)



### 2023-2024 STUDENT AWARDS & PRIZES

In the Fall of 2023 and the Spring of 2024, forty-eight students received more than \$43,000 in awards and scholarships from the Undergraduate Biology Department, which was made possible from contributions from donors to the Undergraduate Biology Fund, Undergraduate Biology Scholarships fund, and the Awards listed below.

These scholarships are instrumental in helping to reduce the financial burden of obtaining a degree and ensuring that a diverse range of students have access to a world-class education and can share unique gifts and perspectives with the University community and the world.

#### UNDERGRADUATE AWARDS:

ERMA REED PETERSON SCHOLARSHIP FOR PRE-MEDICINE SENIORS Adisyn Cornali

LANCE FOSTER OUTSTANDING JUNIOR IN BIOLOGY AWARD Tiffany Chan

#### HOWIESON BIOLOGICAL SCIENCES UNDERGRADUATE RESEARCH OPPORTUNITY

Diego Prieto Jenna Barnes Aphid Sylvester Avery van der Wege Hannah Chern Arianna Siddique Nick Schemmel

IDA H. HYDE SCHOLARSHIP FOR WOMEN Anjali Gupta Marina Stoilova Alicia Pham Sara Flynn

### THE SMILEY GILLIGAN FAMILY FUND FOR THE BIOSCIENCES

Eleazor Abraham Saha Ahmadian Shira Elinov

PAUL A. KITOS OPPORTUNITY IN MOLECULAR BIOSCIENCES RESEARCH AWARD Kendall Cranor Diego Prieto

Nate Schemmel Drew Honeycutt

KEN AND HELEN NELSON OPPORTUNITIES IN THE BIOSCIENCES AWARD Kamar Chahine Samson Mah

#### NATHAN B. PARKER PH.D. STUDENT AWARD IN BIOLOGY

Alexa Magstadt

ROBERT TWEED HERSH MEMORIAL AWARD IN HUMAN BIOLOGY

Alyssa Andoyo

ELLERMEIER JEANNE UNDERGRADUATE AWARD IN BIOCHEMICAL RESEARCH Ethan Rogers

#### GRADUATE TEACHING AWARDS:

ROBERT H. AMMAR GRADUATE TEACHING AWARD Eryk Yarkosky Kiana Hajiarbabi

RICHARD H. HIMES GRADUATE TEACHING AWARD Gabby Perkins Vanessa Schmidt

SALLY K. & KENNETH MASON EXCELLENCE AWARD Sutton Stegman



#### **BIOSCHOLARSHIP RECIPIENTS**

**ROBERT AND LILLIAN BELL BIOSCHOLAR** Gavin Peterson

SMILEY GILLIGAN FAMILY BIOSCHOLAR Kaitlyn Savoy

HALLER SILVA BIOSCIENCES MERIT SCHOLARSHIP Kilee Hale Muhammad (Shahzaib) Asif Lloyd McLaughlin

#### HOWIESON BIOSCHOLAR

Payton Elliott Vivian Marshall Ocean Redmon Nicholas Schemmel Cailin Kessen Meghan Arias Arnav Jain Alexa Magstadt

JIM A ORR BIOSCHOLAR John (Parker) Colip

ELIO SCHAECHTER BIOSCHOLAR Lydia Dorton Pande Om

GOLDWATER SCHOLARSHIP Kaitlyn Savoy



(ABOVE) THE DIXON LAB JOINS BIOSCHOLAR ALEXA MAGSTADT AT HER RESEARCH PRESENTATION AT THE 2023 BIOSCHOLARS RECEPTION

(BELOW) TWO FRESHMAN BIOSCHOLARS AT THE 2023 BIOSCHOLARS RECEPTION



#### UNDERGRADUATE BIOLOGY GRADUATION RECOGNITION CEREMONY

Two Hundred Thirty-four graduating students and their families joined the faculty and staff of Undergraduate Biology, Ecology & Evolutionary Biology, and Molecular Biosciences at the Horejsi Family Volleyball Arena, on Saturday May 11, 2024.

The 2024 graduating class selected three faculty for the "Stephen Benedict Most Impactful Professor Award", Dr. Justin Blumenstiel, Dr. Scott Hefty, and Dr. Dyan Morgan. Congratulations and continued success to the Class of 2024!

# GRADUATE STUDENT NEWS



#### INTRODUCING THE FALL 2024 COHORT back row (left to right):

ZACH OPOKA, MANDI WILD, SAILLESH CHINNARAJ, AZEEM TALABI, NATHANIEL AMASAH, AHNAF SAQIF, PIERO ESPINEL, MARK YORIO, JUSTINE CARBONE FRONT ROW (LEFT TO RIGHT):

CANDICE JOHNSON, NOSHIN NAWAR, SYEDA BEGUM, MALIHA ZINNIA, COMFORT ABE, AIDAN O'HARA, SUMAYA JAHIN

# MOLECULAR

#### FELLOWSHIP & TRAVEL AWARDS

**ALEC BEVIS** (Orozco lab) was a recipient of the Beckloff Travel Award to attend the national American Association of Immunologist (AAI) Immunology 2024 Meeting, in Chicago, IL on May 3-7, 2024. He presented a poster titled "The Autoimmunity-Associated Minor Allele of PTPN22 enhances antiviral immunity during coronavirus infection." Bevis also received a Young Investigators Travel Award given by the conference organizers.

Alec was also awarded the Trainee Poster Award at the American Association of Immunologists (AAI) National Conference, May 2024 and received a KU Molecular Biosciences Graduate Student Travel Award, Spring 2024.

MACIE PROCTOR-ROSER (PhD candidate) has been awarded the Madison and Lila Self Fellowship. Macie is a first-year Microbiology track Ph.D. student and will be beginning her graduate research career in Dr. Robin Orozco's Immunology Lab, where she will study the impact of protein tyrosine phosphatase non-receptor type 22 (Ptpn22) in B Cell Lymphocytes during viral infection. Macie also won the SACNAS Conference Travel Scholarship from Northern Arizona University and a MB Symposium Poster Presentation Award.

**ANAM SHAIKH** (Orozco lab), also recipient of the Beckloff Travel Award, gave both a podium and a poster presentation titled "Improving immunity against chronic virus infection using an autoimmunity associated Ptpn22 allele" at the Chicago AAI Immunology 2024 Meeting. Her Beckloff travel award was paired with a Young Investigators Travel Award given by the conference organizers.

**SAEIDEH NASIRI** (Antunes lab) was a recipient of the Bell Travel Award to attend the American Society for Microbiology (ASM) Microbe 2024 conference in Atlanta, GA on June 13-17, 2024. Nasiri wished to convey the importance of the award she received which allowed her to attend one of the largest conferences in the field of microbiology.

JENNIFER AMREIN (Ackley lab) was the recipient of the Bell Travel Award to attend the 2024 Alzheimer's and Parkinson's Diseases conference in Lisbon, Portugal from March 5-9, 2024. She presented a poster entitled "Developmental Stress Can Cause Synaptic Loss in Aging C. elegans." Amrein said,

"Receiving the Bell Travel Award has allowed me to attend my first international conference. I was able to engage with and get to know researchers from around the world. I gained new insights, from basic science to clinical applications, on the advancements in the field of Alzheimer's disease. I am grateful for having had the opportunity to share my research and make connections that would not have otherwise been possible."

ANDREW EVANS (Dixon lab) was the recipient of the 2024 Candlin Travel Award to attend the American Association for Cancer Research Annual Meeting on April 5-9, 2024. "It was an honor to receive the Spring 2024 Molecular Biosciences Travel Award. With the award, I traveled to San Diego, California, to present my research titled "Effect of XPO1 Inhibition in Colorectal Cancer Tumorigenesi" at the American Association of Cancer Research Annual Conference. Through this opportunity, I was able to connect and interact with some of the top cancer biologists in the world. Their insight and feedback have already proven to be invaluable. Additionally, this poster presentation has put me in contact with numerous individuals who have introduced opportunities for me to present my research elsewhere, thus allowing me to expand my professional network," said Evans. allowed me to share my findings and receive constructive feedback from experts. This exposure was critical to refining my research and expanding my academic network" Teixeira said.

#### MB TRAINEE ACCOMPLISHMENTS

**KELSEY HOOPER** (Lundquist Lab) successfully defended her PhD dissertation titled: "A ventral source of UNC-6/ Netrin is not required for dorsal-ventral axon guidance" on November 30, 2023. She started a job as a Genome Analyst for GenDX, a medical genetics diagnostics company.

**CATHERINE KERR** (Fehr Lab) successfully defended her PhD dissertation titled " Insights into the novel interactions between the coronavirus macrodomain and the host innate immune response "on January 12, 2024.

LANJING WEI (Ph.D. student at the KU Bioengineering Graduate Program, mentored by Liang Xu) successfully defended her Ph.D. thesis entitled: "Sensitizing cancer to chemotherapy by targeting the RNA-binding protein HuR", on February 28, 2024. She has accepted an offer to do post-

### BIOSCIENCES

**RAYSSA DURAES LIMA TEIXEIRA** (Ferreira lab) was also a recipient of the Bell Travel Award. "Winning the MB Travel Award provided me with the opportunity to attend a highly regarded microbiology conference held in Atlanta this year, the ASM Microbe. The conference brought together several microbiology scientists, presenting cutting-edge research, and promoting discussions about the latest advances. Being able to participate in this event was an invaluable experience for my professional development. Furthermore, the travel award allowed me to present my own research to an international audience. Giving a talk about my work at such a prestigious conference was very important. This

doc training at the cancer biology program in Dana Farber Cancer Institute, Harvard University, Boston, starting next month.

**ANAM SHAIKH** (Orozco Lab) was awarded the 2024 University of Kansas Cancer Center's (KUCC) Jewell Summer Research Training Program (JSRTP) which will support her summer salary. The KUCC JSRTP program offers its recipients hands-on, mentor-guided research opportunities by giving them the chance to take part in an eight-week project (June 3 to July 26, 2024) aimed at tackling the complexity of cancer.

#### 2023/24 GRADUATES

Last year, eight postgraduates finished their degrees with the department of Molecular Biosciences. Congratulations to Cory Jenkinson, Kelsey Hooper, Catherine Kerr, Sahida Afroz, Reem Khattabi, Doha Sleem, Maggie Schedl, and Alicia Brown!

#### ASM JAYHAWK MICROBIOLOGY CLUB

On April 1st, 2024, the ASM Jayhawk Microbiology club made art with a strain of bacteria! The strain used is an *E. coli* BL21 strain that contains plasmids with pigment genes. Students used their artistic abilities and their lab skills to produce art with a living microorganism! After streaking the bacteria onto LB plates with Kanamycin, the petri plates were incubated overnight to grow and within 24 hours the students could see their drawings, but instead of pencil, paint or pen what they saw was bacterial growth from streaking with loops and needles!

This event was a huge success for the Microbiology club and became something that the club wants to do every year, if not once, maybe twice during the school year. Students had so much fun participating and doing something in lab that allows them to use creativity and imagination to create something truly remarkable!



#### FACULTY IN FOCUS NEWS FROM MOLECULAR BIOSCIENCES RESEARCH HIC JOANNA SLUSKY (Associ bioscience) and computer

**3RD ANNUAL KU CHEMICAL BIOLOGY SYMPOSIUM** was held on Oct 25/26th, 2024. This symposium brought together 175 regional scientists to showcase their research at the interface of Biology and Chemistry. Drs. Matthew Bogyo (Stanford University) and Tyrrell Conway (Oklahoma State University) were keynote speakers for the event. The symposium is organized by the NIH funded Center for Chemical Biology of Infectious Disease (PI Scott Hefty) and the Dynamic Aspects of Chemical Biology training grant (PIs Brian Ackley and Rebecca Whelan). The graduate students have an essential role in organizing and administering the symposium to enhance their professional development.



Keynote Speaker, Dr. Kristi Neufeld was also honored as co-leader of the Cancer Biology research program from 2009-2024, at the KU Cancer center Cancer Biology Research Program annual retreat. More than 100 individuals attended and 45 student posters were presented. RESEARCH HIGHLIGHTS JOANNA SLUSKY (Associate Professor of molecular

biosciences and computational biology) & a team of KU researchers have created a new and powerful dataset shedding light on different types of beta barrels and their evolutionary relationships to facilitate drug development.

**ROBIN OROZCO** (Assistant Professor)has unveiled new research that explores how a common mutation in the human population changes immune response during a virus infection. Dr. Orozco recently published these findings in PLoS Pathogens and provided foundational building blocks for researchers to better understand how this mutation is enhancing anti-viral immune function.

**BERL OAKLEY** (Irving S. Johnson Distinguished Professor) played a key role in deciphering a previously unidentified cluster of genes responsible for producing sartorypyrones, a chemical made by the fungal pathogen *Aspergillus fumigatus*, whose family causes Aspergillosis in humans. Their findings were published as the cover story of the peer-reviewed journal Chemical Science, the flagship journal of the Royal Society of Chemistry.

Aspergillosis threatens the life of more than 300,000 people each year. A better understanding of the genes responsible for the chemicals — or "secondary metabolites" — produced by *A. fumigatus* and its fungal cousins could help researchers develop more effective antifungal drugs.

ERIK LUNDQUIST (Professor of Molecular Biosciences and Associate Vice Chancellor for Research) and colleagues have added new specifics to the role Src plays in our biology, showing the gene is required for healthy development of the nervous system.

Many people are familiar with oncogenes — genes long known to be involved in cancers in humans, such as the gene "Src."

What's less widely understood is that oncogenes didn't evolve just to cause cancer in species, but rather to control events of normal grow th and differentiation.

"As an organism grows from a single fertilized egg to form all the different tissue types, these oncogenes, including Src, evolved to control these normal events," said Erik Lundquist, professor of molecular biosciences and associate vice chancellor for research at the University of Kansas. "To understand what these oncogenes are doing in cancer, it's important to understand what they're doing in normal development when they're not defective. When Src gets a mutation that causes it to be defective, it becomes an oncogene. But we're looking at

what Src does in a normal developmental context."

#### **GRANTS & AWARDS**

JOANNA SLUSKY (Associate Professor) received a fouryear grant from the National Institute of General Medical Sciences with a total cost of \$ 1,244,968. The NIH funded study, entitled "Plugging & Pulling-in: tuning peptides for ToIC to overcome antibiotic resistance" will look into antibiotic resistance; an increasingly dire global health challenge.

MIZUKI AZUMA (Associate Professor) was awarded a pilot grant from the Braden's Hope Foundation. The project entitled *Identifying compounds that target vulnerabilities imposed by EWS haploinsufficiency* to discover novel treatments for EWSR1 fusion-positive childhood sarcomas aims at identifying the compounds that targets EWSR1-happloinsufficient cells. This research project will be conducted in collaboration with Tomoo Iwakuma, professor of cancer biology at KUMC, and Anuradha Roy, director of the KU High Throughput Screening Laboratory

LIANG XU (Professor) was awarded a NIH STARTUP Central Proof of Concept (POC) Program Award. STARTUP Central stands for Smart Tools to Accelerate Research Translation by Uplifting Participants for the **Central IDeA** state region. Dr. Xu's project is titled *Heating up "cold" tumor: improve cancer immunotherapy by targeting RNA-binding protein HuR*. This new award will provide seed funding to support translational research for small business grant proposals and licensing of pending KU patents.

**ROSANA FERREIRA** (Assistant Professor)was awarded a Spring 2024 New Faculty Research Development Award by the KU Office of Research. The title of the proposal is "*Bacterial interactions and their role in the skin microbiome composition.*"

**STUART MACDONALD** (Professor)received a new NIH National Institute on Aging award to execute largescale studies to identify genes contributing to lifespan variation in fruit flies. This work has been funded by a 2-year NIH-NIA R21 award entitled "*Evaluating a powerful genetic mapping framework to discover lifespan extension genes in Drosophila*" (R21 AG086734).



READ THESE STORIES AND MORE AT MOLECULARBIOSCIENCES. KU.EDU/NEWS

#### NEW FACULTY & STAFF

HANS M. DALTON (Assistant Professor) joined the Department of Molecular Biosciences in August 2024. Dr. Dalton started research as an undergraduate at the University of Michigan through their Undergraduate Research Opportunity Program (UROP). Through UROP, he worked for Dr. Richard Neubig



studying proteins and seizures using mice. Dr. Dalton received his Ph.D. from the University of Southern California (USC) in Molecular Biology. At USC, he worked in Dr. Sean Curran's lab and studied aging, stress, and development using the small roundworm, C. elegans. As a postdoc, Dr. Dalton worked in Dr. Clement Chow's laboratory at the University of Utah. There, he worked on screens to find genetic and pharmacological connections to rare genetic diseases. Building on his postdoc work, Dr. Dalton strives to study a diverse set of rare genetic disorders. His long-term goals are to discover new biology in essential gene pathways and find potential therapeutics for rare diseases.

EMILY A. BECK (Assistant Professor) joined the Department of Molecular Biosciences in August 2024. Dr. Beck received her Ph.D. in Genetics from the University of Iowa in Dr. Ana Llopart's lab in the Department of Biology. During graduate school, Dr. Beck studied mitochondrialnuclear genomic coevolutionary



dynamics in Drosophila. After graduate school, Dr. Beck pivoted substantially with the help of an NIH-NRSA fellowship to study how host genetic variation impacts intestinal health and microbiome composition in threespine stickleback fish with Dr. William A. Cresko at the University of Oregon's Institute of Ecology and Evolution. Dr. Beck then combined these two research areas to build a new research program focused on how mitochondrial genomic variation impacts mito-nuclear dynamics and how perturbation of these dynamics leads to a wide-range of "mitochondrial diseases" like Alzheimer's disease, ALS, MS, Parkinson's disease, cancer, diabetes, schizophrenia, and more. Dr. Beck started this program as an Assistant Research Professor in the School of Computer and Data Science at the University of Oregon.

Now at KU, Dr. Beck's lab focuses on the use of evolutionary mutant models – threespine stickleback and Antarctic icefish. The lab combines dry and wet lab techniques to study genomics and cellular physiology. The long-term goals of the lab are to understand the genomic and physiological compensations these animals have evolved to support unique mitochondrial genomic and morphological modifications and test if these successful evolved compensations can be used as therapies for humans with mitochondrial diseases.

ALLIE GRAHAM (Assistant Professor) joined the Department of Molecular Biosciences and the Center for Genomics in Fall 2024. Dr Graham received her PhD in Biology from the University of Miami where she studied the genomics of high-altitude adaptation in Andean Waterfowl.



She was also an NSF Postdoctoral Research Fellow in Biology (PRFB) at the Oregon State University, and then both an NIH T32 Fellow in Hematology plus an NIH K99/R00 Pathway-to-Independence Fellow at the University of Utah. Her postdoctoral work focused on the mechanisms associated with hypoxia tolerance across all manner of animals, including zebrafish, copepods, cnidarians and ctenophores! Her lab will use an integrative approach – from large scale genomics to targeted molecular techniques in model systems - to investigate how organisms respond to low-oxygen, and how we can apply that knowledge to hypoxia-related disease pathologies.

NICOLE SUCHY joined the Department of Molecular Biosciences as Administrative Associate in 2023.

#### PROMOTIONS

**BRIAN ACKLEY** was promoted to full professor in 2023 and became the Co-Director of the Undergraduate Biology Program.



**SCOTT HEFTY** became the New Chair of Molecular Biosciences.

JOANNA SLUSKY was promoted to full professor in 2023. She is also now serving as associate chairperson for the Department of Molecular Biosciences.

#### DEPARTURES

**DAN DIXON** (Professor) has left KU to begin a new leadership role at the University of Arkansas Medical School. He is the Associate Director of Community Outreach and Engagement for the UAMS Cancer Institute. We appreciate his broad contributions, including those associated with the KU Cancer Center.

**YINGLONG MIAO** (Associate Professor) has accepted a new faculty position at the University of North Carolina School of Medicine.

IN MEMORIAM JOHN C. (JACK) BROWN (FEBRUARY 23, 1943 - OCTOBER 9, 2023)



Molecular Biosciences is saddened to share that Emeritus Professor John C. (Jack) Brown died on October 9, 2023. Jack was born February 23, 1943, grew up in Alabama, and earned bachelor's and master's degrees from Auburn University. Following service as a Lieutenant in the Navy, he earned a PhD in Biochemistry from North Carolina State University and carried out post-doctoral research at the University of California, Berkeley.

He began his professional career at the University of Kansas in 1976 in the Department of Microbiology (later Molecular Biosciences), where he remained for 33 years - until his retirement in 2009. Jack's research at KU focused on autoimmune diseases, and the influence of total parenteral

nutrition (TPN) on the immune system, and was funded for many years by the National Institutes of Health. He was also an elected member of the American Association of Immunologists. Jack's professional service was highly sought at the department, university and broader professional levels and led to his holding (often chairing) a multitude of service positions; including many years of service reviewing manuscripts for numerous journals, grant proposals for the NIH, various committees shaping graduate education at the department and university levels, and serving as Associate Chair of Molecular Biosciences.

Jack was also a dedicated educator and touched the lives of many hundreds of undergraduate and graduate students at KU. Throughout his career, his classroom teaching was in the areas of immunology (at undergraduate and graduate levels) and introductory microbiology. He was a six-time nominee and three-time recipient of the Favorite Biology Professor award from graduating classes of biology students.

In the 1990s, Jack began a website called "Bugs in the News!" where he posted popular articles explaining microbiology and immunology topics using nontechnical language, most recently explaining the mRNA vaccines developed to protect against COVID.

Following his retirement, Jack moved to the Chicago area with his wife Mary Hise. There, Jack coauthored book chapters with Mary, served as a scientific consultant for several companies, enjoyed meeting people, playing music and singing, and spending time with family - especially his three children and five grandchildren. One of his last requests was to make sure all of his friends knew just how much he loved and appreciated their friendships throughout the many beautiful chapters of his life.

We offer our sincerest condolences to Jack's family and all those mourning his loss.



BioHawk 21



## GRADUATE STUDENT NEWS



INTRODUCING THE FALL 2024 COHORT calvin belton, katherine crawford, syrus decena, kenzie grover, cailin kessen, danielle land, nikki lemus, rashmi liyanage, amy mays, sydnie mcmahan, diane nguyen, linh nguyen, karina yanez aroche, zane walker.

# ECOLOGY & EVOL

#### GRADUATE STUDENT RECOGNITION

Congratulations to the seventeen 2023 - 2024 students who finished their post graduate degrees in Ecology & Evolutionary Biology!

#### FALL 2023 GRADS:

Adeola Adeboje, Lucas DeCicco, Alex Fulk, Claudia Nunez Penichet, Daniel Romero-Alvarez.

#### SPRING 2024 GRADS:

Katherine Hanselman, Ana Mendoza Maya, Amy Betz, Kari Snelding, Tokee Tareq, Brooke Bernardt, Naomi Betson, Devon DeRaad, Sharifu Tusuubira

#### SUMMER 2024 GRADS:

Sean Nash, Zachary Storc, Kent Setiawan.

#### FELLOWSHIPS & GRANTS

ZANE WALKER – Chancellor's Doctoral Fellowship DANIELLE LAND – Self Graduate Fellowship MARINA STOILOVA – Self Graduate Fellowship KEVIN MULCAHEY – Self Graduate Fellowship CAILIN KESSEN – Self Memorial Scholarship MARTEL ELLIS – NSF -GRFP DOROTHEA SUMMERS – NSF-GRFP EMELY NIKKI LEMUS – NSF-GRFP AUSTIN NGUYEN - NSF-GRFP

#### TRAVEL FUNDS AWARDED FROM COLLEGE OF LIBERAL ARTS & SCIENCES:

ANAHI QUEZADA - Entomology 2024

**BLANCA RODRIGUEZ** - National Diversity in STEM Conference and Chapter Officer Leadership October Retreat

### DEPARTMENTAL AWARDS & SCHOLARSHIPS

#### MARY HARKEY HALL BOTANY ENDOWMENT AWARD

AUSTIN NGUYEN received a research grant of \$1,250.00. ASKHAN SHAMETOV received a research grant of \$790.00.

**REB BRYANT** received a research grant of \$1,400.00.

**LUIS JAVIER MADRIGAL ROCA** received a research grant of \$1,500.00.

#### MARY HARKEY HALL AWARD IN PLANT BIOLOGY

AREZOO FANI received \$800 to travel to a conference. AUSTIN NGUYEN received \$800 to travel to a conference. CEYDA KURAL received \$800 to travel to a conference. HAYLEE NEDBLAKE received \$800 to travel to a conference.

KARINA YANEZ AROCHE received \$800 to travel to a conference.

KAYLA CLOUSE received \$800 to travel to a conference. REB BRYANT received \$800 to travel to a conference. TAYLOR MICHAEL received \$800 to travel to a conference.

#### FALL 24 ENTOMOLOGY ENDOWMENT AWARDS

**ANAHI QUEZADA** received \$1500 from FA24 Conference Travel Award and the Byron Alexander Memorial Entomology Fund to attend the conference of the Entomological Society of America.

**ANDRES FELIPE HERRERA** received \$1500 from FA24 Conference Travel Award and the Byron Alexander Memorial Entomology Fund to attend the conference of the Entomological Society of America.

**WYATT ZABINSKI** received \$1500 from the FA24 Conference Travel Award and the Byron Alexander Memorial Entomology Fund to attend the conference of the Entomological Society of America.

**PETER CHARLES WILLADSEN** received \$1100 from the FA24 Conference Travel Award and William J. Bell Memorial Entomology Fund to attend the conference of the Entomological Society of America.

(BELOW) GRAD STUDENT ANDRES FILIPE HERRERA (LEFT) TRAVELED ABROAD AND STUDIED BEES IN COLUMBIA WITH DR. VICTOR H. GONZALEZ (NOT SHOWN).

# UTIONARY BIOLOGY

### SPRING 24 AWARDS TO ATTEND AN INTERNATIONAL CONFERENCE FROM BOTANY ENDOWMENT

**KEANA TANG** received \$1000 to attend an international conference.

KELLY PFEILER received \$1000 to attend an international conference.

**MEG NIBBELINK** received \$1000 to attend an international conference.

#### VAL AND MARILYN SMITH PHD GRADUATE STUDENT SUPPORT ENDOWMENT FUND

ALEX MAILE received \$300 to travel to a conference. ANJALI GUPTA received \$300 to travel to a conference. JESSICA WILHELM received \$300 to travel to a conference.

KATHLEEN RUST received \$300 to travel to a conference. SARAH FLYNN received \$300 to travel to a conference. CHENCHEN SHEN received \$300 to travel to a conference.



# FACULTY IN FOCUS



#### NEWS FROM ECOLOGY & EVOLUTIONARY BIOLOGY

JORGE SOBERÓN (University Distinguished Professor) after three and half years of outstanding leadership, concluded his term as director of the KU Biodiversity Institute and Natural History Museum in late June. Soberón is a University Distinguished Professor of Ecology and Evolutionary Biology and a senior scientist in biodiversity modeling who has used his role and expertise to educate and inspire countless staff, students, and museum visitors during his time as director. *Image courtesy of Christine Metz Howard* 



RICH GLOR (Associate Professor) and Mark Herr (EEB Ph.D. student) taught a herpetology field course in June 2024, where students spent two weeks learning how to conduct basic scientific field research with reptiles and amphibians.

NICO FRANZ (Professor) was named the new director to lead Biodiversity Institute & Natural History Museum and began his work at KU in mid-August.



#### GRANTS AND AWARDS

**RAFE BROWN** (Professor) has received a Fulbright U.S. Scholar Award to travel to the Philippines to study biodiversity.

The Fulbright award will allow Brown to spend a year in the Philippines conducting fieldwork to sample amphibians and reptiles. The research studies the biodiversity of a rare stretch of pristine tropical forest that extends from a volcanic peak to the sea.

Brown's sampling will create a baseline for annual comparisons and follow-up surveys. The data could one day be used for conservation efforts and establishing a peninsula-wide management plan

KELLY MATSUNAGA (Assistant Curator of Paleobotany and Thomas N. Taylor Assistant Professor of Ecology & Evolutionary Biology) has received a Faculty Early Career Development (CAREER) Award from the National Science Foundation.

#### NEW FACULTY

JENNIFER E. JOHNSON (Assistant Professor) joined the Department of Ecology & Evolutionary Biology in August 2024. Dr. Johnson received her Ph.D. in Ecology and Evolutionary Biology from Stanford University working with Dr. Christopher Field. Her core research interests are in understanding photosynthesis and respiration in a carbon cycle and global change context. During graduate school, Dr. Johnson studied

the C3-C4 intermediate photosynthesis, a rare but naturally occurring pathway that is thought to be the evolutionary bridge between the C3 and C4 photosynthetic pathways that dominate terrestrial ecosystems today. After graduate school, Dr. Johnson completed postdoctoral training at



the University of Arizona with Dr. Russell Monson, an expert on C3-C4 photosynthesis, and then moved to the Carnegie Institution to work with Dr. Joe Berry, an expert on quantitative modeling of photosynthesis. Working together, Dr. Johnson and Dr. Berry developed a new general model of the way that photosynthesis responds to light. Now, Dr. Johnson's research program is carrying this line of research forward. Current activities include development of new instrumentation for studying photosynthesis across scales, smallerscale experimental studies of the light response of photosynthesis in higher plants, and applications of the new photosynthesis model in larger-scale models of land surface processes that are used within Earth system models. The long-term goals of the Johnson lab are to advance fundamental understanding of how photosynthesis and respiration work, and to develop improved approaches for monitoring the aggregate activities of these processes at the Earth system scale.

KATYA L. MACK (Assistant Professor) joined the Department of Ecology and Evolutionary Biology in January 2024. Dr. Mack received her Ph.D. at the University of California, Berkeley in Integrative Biology in Michael Nachman's lab. Her thesis used house mice as a model system to study the genetic basis of adaptation, the process by organisms evolve to match their environment, and speciation, the process by which

new species arise. She completed her postdoctoral Stanford training at University Hunter in Fraser's lab, where she received further training in computational biology and statistical genomics. Now, the Mack lab is expanding on Dr. Mack's previous research to investigate the relationship between



genotype and phenotype for complex traits that affect fitness. Her lab specifically focuses on understanding this by studying gene regulation -- the process used to control the timing, location, and amount to which genes are expressed -- how gene regulation evolves within and between species. Dr. Mack has worked on a wide range of systems (e.g., yeast, rodents, cavefish, stickleback) but primarily focuses on mammals as a model for examining big questions in evolutionary genetics.

DAN RUFFING joined EEB as the Greenhouse Manager for the Haworth and West District Greenhouses in January 2024. Dan received a BA in Mathematics and Applied Statistics from Grand Valley State University in 2012, and for the first part of his career, worked as an Applications Engineer in Robotics for Automotive Manufacturing. He continued his career in Robotics for

almost a decade as a Project Manager and finally a Sales Engineer before returning to school during the COVID pandemic.

While earning a degree in Environmental Biology at Eastern Michigan University, Dan was a part of the Grman Lab, researching interactions between Prairie Legumes,



Rhizobia, and Arbuscular Mycorrhizal Fungi, and performed field work at many restored prairie sites throughout lower Michigan. He also worked at the Terrestrial and Aquatics Research Greenhouse, caring for EMU's extensive plant collection, and assisting other researchers with greenhouse experiments. In addition to his employment at EMU, Dan was also president of the Botany Club, and ran the Giving Garden donation plots that helped support local food panties. He received his degree in the winter of 2023 before moving down to Lawrence. Dan's goals at KU are to: 1) Improve the Greenhouse space to be more open, welcoming, and accessible for students and community members, 2) Increase species diversity in KU's plant collection and improve horticultural practices, and 3) Increase the Greenhouse/EEB's botany outreach throughout KU and the local community through tours, events, and plant sales/giveaways. He encourages everyone to stop by the Haworth Greenhouse to say hi and see some of our incredible collection!

#### PROMOTIONS

JUSTIN BLUMENSTIEL was promoted to Full Professor in Fall 2024.

MAGGIE WAGNER was promoted to Associate Professor with Tenure and Associate Scientist (for her joint appointment at KBS-CER) in Fall 2024.

SHARON BILLINGS was named University Distinguished Professor in 2023.



### RARE FLOWER BLOOMS AT HAWORTH GREENHOUSE

On Saturday, August 10, 2024, an endangered Titan arum (*Amorphophallus titanum*), or Corpse Flower, bloomed at the University of Kansas Ecology and Evolutionary Biology Greenhouse in Haworth Hall! This rare plant is native to the island of Sumatra, Indonesia, and generally blooms once every three to seven years in greenhouse conditions, though it could be a decade or more between blooms in the wild. This particular *Amorphophallus titanium* last bloomed on September 13, 2021.

Corpse plants are called such because when they bloom, they attract carrion beetles and flies to help pollinate it via a particularly pungent scent of rotting meat. Peak bloom occurred on Saturday, when the spathe unfurled and revealed the flowers at the base of the spadix. In addition to the intense rotting meat smell, the flower's coloring resembles rotting flesh, and the spadix generates heat to simulate a fresh corpse - it was 15 degrees hotter within the spadix than without! While there are no carrion beetles in the greenhouse to help with pollination, Dan Ruffing, KU Greenhouse Manager, harvested the pollen from this flower in order to hand pollinate future flowers. Now that the flower has bloomed, in several days it wilted away, and the bulb will be dormant for several months before re-entering the vegetative cycle. After several more years of storing energy, it will flower once again.

The Haworth greenhouse has six *A. titanum* plants. In addition to the largest that is currently flowering, there are three smaller baseball-sized bulbs in the vegetative cycle, and two young plants with small leaves. The smallest plants were grown from seed at Kansas State University using pollen from our corpse flower at KU.

Over 300 people came to see the corpse flower in bloom on Saturday and Sunday at the KU Lawrence campus.

#### BIOGEM

A new training program based at the University of Kansas will help develop a scientific workforce equipped to answer this complex question. With support from a \$2.9 million grant from the National Science Foundation, the BioGEM program will prepare postbaccalaureate scholars to better understand organisms' past responses to changing environments so they can better predict and hopefully mitigate — devastating future impacts.

Over a three-year period, BioGEM will recruit 30 recent bachelor's graduates who have limited or no prior research experience to work with mentors on interdisciplinary research projects that span time scales, biological hierarchies and organisms.

#### NEWS FROM THE FIELD STATION

During the 2023 season, research activity at the KU Field Station continued its increase toward pre-pandemic levels. The number of active research projects at the Field Station varies annually and includes many longterm studies, some requiring extensive infrastructure.

In 2023, 53 projects were active, engaging 78 researchers from 13 different research units or departments across KU, and 15 external institutions, agencies and organizations. In addition, a team of research technicians from the National Ecological Observatory Network (NEON) continued regular visits to monitor species and atmospheric conditions. NEON is a longterm, continental-scale with 81 field sites.

In our first full year with an education program coordinator for the KU Field Station, public

programming included 77 events reaching more than 2,700 people. These events included K–12 programs (19), volunteer opportunities (11) and diverse programming that provided opportunities to explore the natural wonders of Kansas ecosystems (47) through various formats.

One key outreach program based at the Field Station is the Ecosystems of Kansas Summer Institute, an outreach component of the five-year, \$20M National Science Foundation EPSCoR MAPS (Microbiomes of Aquatic, Plant and Soil Systems) program, a collaboration among five Kansas universities. During the program's first four years, it was held for one full week for secondary science teachers in Kansas, providing them an opportunity for them to work with KU scientists to learn about current research and methods that link to K-12 science standards. More than a dozen scientists from our research center have participated as instructors. In 2023, the fifth and year, a three-day program was held for middle school teachers. This program will continue with funding from the Kansas Biological Survey & Center for Ecological Research, which manages the Field Station.

The Field Station's Armitage Education Center was open for retreats and planning sessions for KU faculty and staff, and the public trail system and the KU Native Medicinal Plant Research Garden were open dawn to dusk for individual visitors, special events and tours.

PHOTO: LAURA PODZIKOWSKI (CENTER), A KU GRAD AND POSTDOCTORAL RESEARCHER IN THE LAB OF SHARON BILLINGS, CONDUCTS RESEARCH AT THE DIMENSIONS IN BIODIVERSITY SITE AT THE KU FIELD STATION. PHOTO CREDIT: BOB HAGEN



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