The Natural Inquirer

FORT HAYS STATE UNIVERSITY DEPARTMENT OF BIOLOGICAL SCIENCES

Fall Semester, 2017

E·S·K·A·P·E· Club: *Crowdsourcing antibiotic discovery in the wild, wild west*

The E.S.K.A.P.E. pathogens (***E**nterococcus faecium*, ***S**taphylococcus aureus*, ***K**lebsiella pneumoniae*, ***A**cinetobacter baumannii*, ***P**seudomonas aeruginosa*, and ***E**nterobacter* species) are a group of bacteria that have developed multiple resistances to antibiotics. Antibiotic resistance occurs when bacteria evolve to survive and multiply in the presence of antibiotics. These organisms consistently "escape" the effects of many antibiotics, are the leading cause of nosocomial (hospital-acquired) infections throughout the world, and are a growing threat to public health.

FHSU SWI students (L-R): Jonathan Emig, Jacob Lutgen, Morgan Mitchiner, Jacob Lee, Sarah Nansel, Georgie Tauber, and Michael Stricker.

Small World Initiative (SWI) is an innovative program that encourages students to pursue careers in science while setting up a unique platform to address the growing antibiotic crisis. Active in more than 250 participating schools across 38 US states, Puerto Rico, and 14 countries, SWI combines technology, science, and innovation to make meaningful and measurable improvements in the global education and healthcare landscape.

The FHSU SWI research group, led by Ms. Claudia Carvalho, tested bacteria obtained from soil samples against relatives of E.S.K.A.P.E. pathogens. The goal of this study was to find new antimicrobial agents effective against E.S.K.A.P.E. pathogens. Bacteria were isolated from soil samples collected at 3 different sites near Hays, KS (an oil well outside of town, the city's compost site, and Big Creek). Four of the bacteria samples showed effectiveness against E.S.K.A.P.E. pathogen relatives, and DNA sequencing showed all 4 were Gram positive bacteria in the *Bacillus* genus. Organic extraction was performed to isolate the inhibitory component, then each extract was retested against bacterial lawns of the E.S.K.A.P.E. relatives for confirmation.

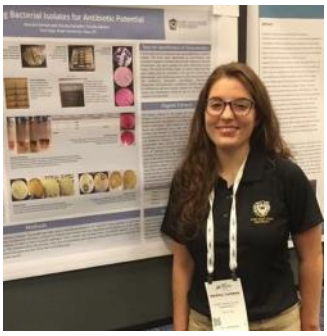
Small World Initiative
crowdsourcing antibiotic discovery

The FHSU pollinator garden, doing well in its 2nd year and now with new "No spraying or collecting please" signs!

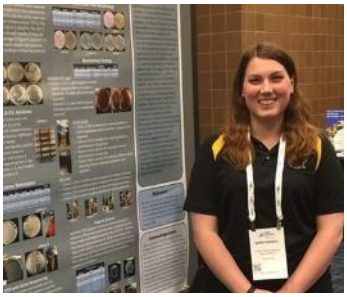
Inside this issue:

Meetings and Presentations

American Society of Microbiology Annual Meeting, June 1-5, New Orleans, LA

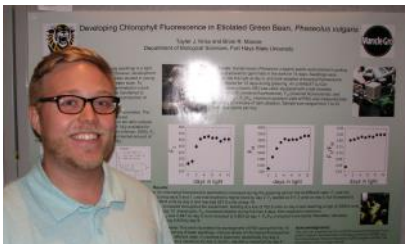


Testing bacterial isolates for antibiotic potential (poster). M. Carmen and C. Carvalho.



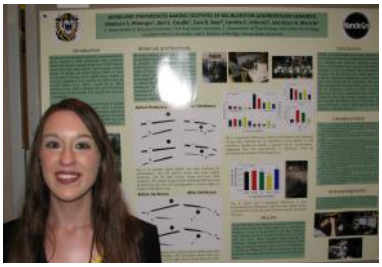
Isolation of soil microbes to test against E.S.K.A.P.E. relatives for antimicrobial properties (poster). S. Nansel and C. Carvalho.

Botanical Society of America Annual Meeting, June 24-28, Fort Worth, TX



Developing chlorophyll fluorescence in etiolated green bean, *Phaseolus vulgaris*. T. J. Kriss and B. R. Maricle. **(Li-Cor Prize for best student presentation in the Physiological section)**.

Herbivory preferences among ecotypes of big bluestem (*Andropogon gerardii*). M. S. Pittenger, K. L. Caudle, S. G. Baer, L. C. Johnson, and B. R. Maricle.



Genetic and environmental influences on stomates of big bluestem (*Andropogon gerardii*) ecotypes. N. A. Varvel, C. J. Hilt, S. G. Baer, L. C. Johnson, and B. R. Maricle.

Visiting the Fort Worth zoo (L-R): Tayler Kriss, Madison Pittenger, Chelsea Hanson, Keri Maricle, and Brian Maricle.

Kansas Herpetological Society Annual Meeting, November 4-5, Wichita, KS.

Since 1974 Kansas Herpetological Society

Herpetofaunal community analysis of eastern Kansas with emphasis on the broad-headed skink. A. Hullinger, Z. Cordes, D. Riedle, and W. J. Stark.

A preliminary look at the home range size and population dynamics of the Ornate Box Turtle at Quivira National Wildlife Refuge. D. L. Kramer and W. J. Stark.

Meetings and Presentations, continued:

Kansas Herpetological Society meeting, continued:

Home range size of the Western Massasauga in Cheyenne Bottoms. J. J. Mead and W. J. Stark.

An aerial perspective: Using unmanned aerial systems to identify lizard microhabitat. S. C. Rogers and W. J. Stark.

Grip it and flip it: Using artificial cover to monitor changes in herpetofaunal community composition in response to small-scale prairie restoration (poster). J. Alexander, C. J. Schmidt, M. J. Greer, and M. A. Noland.

Meristic variation in Kansas broad-headed skinks and five-lined skinks (poster). A. Hullinger, Z. Cordes, D. Riedle, and W. J. Stark.

Snake populations at Quivira National Wildlife Refuge: Differences between capture methods (poster). J. J. Mead, R. B. Channell, M. J. Greer, and W. J. Stark.

Survey of anuran chytrid in Kansas and influence of anuran life-history in occurrence (poster). A. Snyder, J. J. Mead, D. Riedle, and W. J. Stark.

Allison Hullinger was awarded the Howard Kay Gloyd-Edward Harrison Taylor Scholarship, an award received by another FHSU graduate student (Josh Mead) in 2016. For additional information on this award, visit http://www.cnah.org/khs/awards.aspx

Society of American Foresters National Convention, November 15-19, Albuquerque, NM.

Relationships among drought and disturbance regimes on subalpine forest in Rocky Mountain National Park: Comparisons between plots in 2001 and 2017. C. A. Hanson and B. R. Maricle.

Congratulations!!

Oaklee Abernathy was accepted to the Kirksville College of Osteopathic Medicine, A. T. Still University, Kirksville, MO.

Lindsey Hurford and **Mattie Schlaefli** were accepted into the 2017 Scholars in Rural Health Program at the University of Kansas School of Medicine. The Scholars in Rural Health Program is designed to identify and encourage undergraduate students from Kansas who are interested in careers as physicians in rural areas. Students apply for the program in the second semester of their sophomore year in college. The program provides Scholars assured admission to the KU School of Medicine upon successful completion of the program requirements and graduation from their undergraduate institution.

Dr. Eric Gillock was featured in a "Community connections" video in August, following his 2016 Outstanding Teaching Award. Dr. Gillock discusses his teaching philosophy in the video, linked below:

https://www.hayspost.com/2017/08/28/community-connection-eric-gillock-ph-d-biological-sciences-professor-fhsu/

Graduate student **Sean Rogers** and **Dr. Bill Stark** prepare to test-fly a drone as part of FHSU's new Unmanned Aerial Systems (UAS) program. Dr. Stark co-advises the program, together with Dr. Craig Smith (Dept. of Agriculture).

Rogers talks to area 4th graders about drones at a "Farm Day" program.

Faculty members **Mark Eberle**, **Dr. Brian Maricle**, and **Dr. Mitch Greer** participated in a vintage base ball game at historic Fort Hays on Saturday, August 26th. The game was played by 1869 rules (when "base ball" was still two words), and the Fort Hays Base Ball Club was victorious over the Topeka Westerns Base Ball Club, 23-17. Thanks to Mark Eberle for organizing the game and to Keri Maricle for taking pictures!

Senegal study abroad

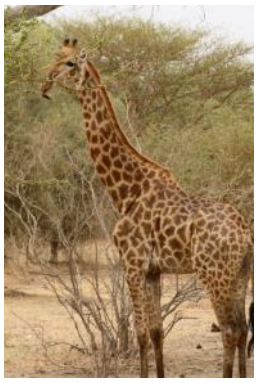
In June, Biology faculty members Claudia Carvalho, Dr. Mitch Greer, and Morgan Noland led a study abroad trip to Dakar, Senegal, West Africa. Ten FHSU students traveled with them, learning about community healthcare and rangeland ecology in Africa.

Top row, L-R: Kaetlin Weninger, Mitch Greer, Amelia Borell, Brinley Evans, Zoey Wallis.

Middle row, L-R: Chloe Million, Yamoudji Diarra, Paulyna Alcorn.

Bottom row, L-R: Teghan Sells, Drew Zimmerman, Aubrey Naden, Claudia Carvalho.

Picture by (and thus not pictured): Morgan Noland



Senegal study abroad, continued

In October, a reception in Albertson Hall showcased the trip. Each of the 10 students presented a poster highlighting their most memorable experiences from Senegal.

Congratulations to these students for completing their master's degrees this semester!

Ariel Snyder (Thesis title: Survey of Amphibian Chytrid (*Batrachochytrium dendrobatidis*) in Kansas and the influence of amphibian life history in occurrence.)

Holly Wilson (Thesis title: Diet and activity patterns of five bat species in Kansas.)

And to these students for completing their oral exams!

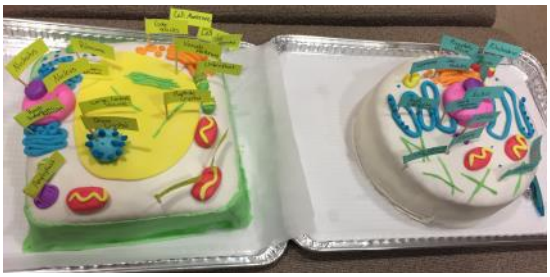
Oaklee Abernathy, Allison Hullinger, Kolin Klozenbucher, Jamie Oriez, Elizabeth Tanner, and Dylan Wise.

Awards

Dr. Medhavi Ambardar was awarded a $3400 FHSU Undergraduate Research Experience (URE) grant titled, "Engaging undergraduates to establish the Western Kansas Avian Ecology Network (WeKAN): a foundation for studying bird behavior and migration". Dr. Ambardar states, "When we notice wild animals, we are typically seeing only a snapshot of that animal's life. The reality is that past experiences can have dramatic impacts on an animal's current state, particularly if the animal is migratory." WeKAN will conduct research on the effects of migratory experiences on bird behavior, physiology, and conservation. WeKAN will engage undergraduate students in collecting and disseminating important data on birds from an understudied region of North America.

Dr. Eric Gillock won the 2018 American Society of Microbiology Graduate Teaching Award. According to ASM, this award "honors an individual for exemplary teaching of microbiology and mentoring of students at the graduate and postgraduate levels, and for encouraging students to subsequent achievement."

Dr. Mitch Greer will be the supervising researcher of National Science Foundation grant of $273,000 awarded to FHSU. The grant will fund two graduate students, along with undergraduate researchers, to study old world bluestem grasses over the next five years. The NSF's Established Program to Stimulate Competitive Research (EPSCoR) awards grants to states in an effort to stimulate competitive research by promoting collaboration between universities within the state. The Kansas grant will bring together FHSU, KU, KSU, WSU, and Haskell Indian Nations University. The proposed work will examine the microbiomes of prairie ecosystems to see how plant, soil, and aquatic microbes are related to or influenced by one another across a precipitation gradient.



Students from Dr. Medhavi Ambardar's Human Biology class baked cakes, cookies, and cupcakes to represent cell structure and mitosis, for extra credit points in December. Ymmm!

FORT HAYS STATE UNIVERSITY'S
KANSAS WETLANDS
EDUCATION CENTER

"Those little devils can really drive a person crazy!" says Avian programs manager Robert Penner about mosquitoes at Cheyenne Bottoms. That's why grad student Gentry Holaday wears a mosquito hood and jacket into the marshes there. Gentry is working with Robert to study how restoration projects and rotational grazing have affected plant communities in three areas of the preserve: native grassland, abandoned cropland, and wetland basins.

We're on Facebook!

Biological Sciences Department at Fort Hays State University

We're on the Web!
www.fhsu.edu/biology

600 Park Street
Hays, KS 67601
Phone: 785-628-4214