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## TEACHING/UNDERGRADUATE AND GRADUATE EDUCATION

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### 1955 (W385) Examining demographics and student interests in an introductory animal science course.

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Over the past 9 yr, the Department of Animal Sciences and Industry at Kansas State University has seen tremendous growth in undergraduate programs (2005  $n = 704$ , 2013  $n = 1197$ ). One of the courses impacted by enrollment growth is ASI 102, Principles of Animal Science (2005  $n = 263$ , 2013  $n = 438$ ). This course is required for Animal Sciences & Industry majors and is a service course to students in the Colleges of Agriculture, Business Administration and Arts & Sciences. Over 9 yr, surveys were given to the students enrolled in ASI 102 during the Fall semester, examining demographics and student interest. These questions examined gender, ethnicity, age, residency, and both primary and secondary specie of interest. Gender distribution has held relatively steady over the years with 61% of the class being female in 2005 and 68% female in 2013. Age distribution held steady with 61% of the class being ages 17–18 yr of age in 2005 and 63% in 2013. Subtle changes in student ethnicity have been shown as the class went from being 92% White/Non-Hispanic to 85% White/Non-Hispanic with the most significant growth in both the Black/Non-Hispanic population (1% in 2005 to 5% in 2013) and the Hispanic/Spanish American/Latin/Mexican population (2% in 2005 to 6% in 2013). The change in residency came from the increase of out-of-state students (18% in 2005 to 23% in 2013), while international students remained 1% each year. Student primary specie of interest in 2005 showed that the most popular specie was beef cattle at 37% of the class, with companion animals close behind at 31%, then horses at 29%, swine or sheep (these were combined because of bubble sheet limitations) at 2% and dairy cattle at 1%. In 2009, the percentage of students with a primary specie interest in companion animals (35%) surpassed those with a beef cattle interest (34%). Companion animals continue to be the most popular species of interest with 39% of the students reporting them as their primary species of interest in 2013, however, beef cattle have held steady at 34%. When students were asked about their secondary specie of interest, horses consistently were the most popular (36% in 2007 and 31% in 2013). Survey results have been extremely useful to categorize students. Examining demographics has allowed us to identify student interest and focus on areas of the course that need greater clarification and emphasis.

**Key Words:** undergraduate, demographics, teaching

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### 1956 (W386) Development of a science education experience for adolescents based on stress physiology and a growing interest in smartphone technology. P. A. Eichen\*, B. Scharf, G. D. Martin, R. Mott and D. E. Spiers, *University of Missouri, Columbia*

Interest in STEM (i.e., Science, Technology, Engineering, and Mathematics) education is increasing among all age groups. In a recent survey of Missouri beef and dairy producers, 98% indicated willingness to use technology to improve management of heat stress in their herds, with about 80% having access to wireless internet and 60% having smartphones. In contrast, only half thought understanding heat stress was important, while 90% of extension livestock specialists noted it is a significant issue. This discrepancy suggests the need for education on this important topic at an early age. To this end, a 2-d “Science Boot Camp” for pre-college students was developed several years ago to stimulate interest in environmental stress issues. A brief survey of the students participating in this camp showed that 90% agreed that science is important, and science education can benefit everyone. In contrast to producers, a majority of the teens had wireless internet and smartphones. Building on the results of this event, we have developed at the University of Missouri a 4-d science camp for adolescents in 2014 (Summers@Mizzou, “The Stress of Life,”). The goal of the camp is to increase understanding and appreciation of science research through experiential learning. A smartphone heat stress app for livestock (i.e., ThermalAid) has been developed in our laboratory, along with a website [thermalnet.missouri.edu](http://thermalnet.missouri.edu). It is incorporated into the camp to illustrate the real-world value of science. Students will be introduced to research methods, and then use state-of-the-art technologies (e.g., ThermalAid, iPads, and iButtons) to collect data on themselves under different environmental conditions. They will then learn to statistically analyze and interpret the results. This information, along with data from cattle at the University research farm, will be incorporated into a final determination of the impact of stress. Students will work in teams to collect videos throughout the camp to be combined with their results into a final presentation. Developing and presenting these videos will give them an opportunity to practice presentation skills, apply new information they have learned, and gain confidence in working with others. Entry and exit surveys will be administered, to assess students’ views on science and technology and the life skills they developed throughout this camp. Future projects will build on the educational discoveries of this camp.

**Key Words:** heat stress, education, technology

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**1957 (W387) Student assessment through a survey instrument of a horse management laboratory course.** M. C. Nicodemus\* and T. L. Bova, *Mississippi State University, Mississippi State*

Inclusion of a hands-on laboratory to the Mississippi State University horse management course, ADS 3223 Horse Management, was done in the spring of 2008, and due to its popularity, this year the course offering will be expanded to both the spring and summer semesters. With course expansion, an understanding of the course impact on students is needed to determine areas that should be explored in future laboratories, and thus, the study objective was to assess through the application of a survey instrument the effectiveness of a horse management laboratory course in developing student's horse handling abilities. Students ( $n = 35$ ) enrolled in ADS 3223 Horse Management were given a researcher-developed, 19 forced-choice question survey instrument at the beginning (B) and end (E) of the semester. Each question described a horse management activity that students rated 1 to 5 for their ability to perform. A score of 5 indicated the student had a perceived high proficiency level for performing all aspects of the described activity. The average score for each question was determined and compared using a one-way ANOVA to determine the impact of the course on handling abilities ( $P < 0.05$ ). While all questions indicated students believed their abilities had improved through completion of the course, a significant impact on skill level according to students' scores was seen in the following areas: basic handling of European (B: 3.2, E: 4.2) and pony (B: 3.3, E: 4.5) breeds and performance-related handling of society-type (B: 2.4, E: 3.4) breeds ( $P < 0.05$ ). Students were acclimated to various breeds through laboratory activities. The highest score given at the end of the semester was associated with the most common laboratory activity, catching, haltering, and leading of adult, well-trained horses (4.75), while the lowest score was associated with an activity not covered in laboratories, handling untrained, young horses (2.7). At the end of the semester, students were able to select suggested future topics to be covered in which training younger horses was the most popular topic (35%). While this topic is covered in another course, the majority of the students were all upperclassmen (70%) that were not taking another equine course that same semester (80%), nor had they taken another equine course in past semesters (55%), and thus, topics not covered proficiently in this course may leave these students lacking in those particular horse handling skills.

**Key Words:** horse management, survey

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**1958 (W388) Educational outcomes of an online course: Pharmaceutical use in cattle.** E. Blythe\*, *West Texas A&M University, Canyon*

Objective: To assess the effectiveness of a distance-based, online course entitled "Pharmaceutical Use in Cattle" by mea-

suring the cognitive knowledge of agricultural science students ( $n = 27$ ) as felt in their confidence level to explain; legal and regulatory issues that affect responsible pharmaceutical use and food safety principles, basic pharmacokinetics, veterinary drug informatics and classes of pharmaceuticals used in the therapeutic treatment of disease states in cattle. The course goal is to provide any interested animal science, dairy science, meat science, agricultural education, and pre-veterinary medicine student an opportunity to obtain knowledge and skills that can positively impact educational, veterinary and economic outcomes by applying drug knowledge resources to beef and dairy cattle operations. Methods: Quantitative and qualitative methods were utilized to assess the effectiveness of the curriculum. A one group, pre-post, quasi-experimental design was used to evaluate the confidence level and application skills of the students. A 5-point Likert scale was used to measure confidence levels. Improvement in confidence is expressed by standard deviations and confidence intervals. Results: Cognitive post-course scores improved significantly over the pre-course scores on all 11 survey questions. The analysis for each question indicated an increase in the cognitive measure as a result of completing the course curriculum. The reflective commentary on how students will utilize concepts learned in the course was positive. Students reported that increased knowledge in all topic areas would enhance their ability to; implement patient safety and food safety principles, serve as the basis for educating others under their supervision, and ultimately benefit the end consumer and industry. Additionally students reported; increased awareness of the depth of drug control regulations, the desire to demystify drug use in cattle, desire to strengthen working relationship with their attending veterinarian, and improve overall herd health, quality and performance. Students also reported applying what they learned to their personal cattle, to the job market, competitive internships and graduate thesis work. The large majority of students reported a near complete lack of self-awareness on the many facets of pharmaceutical use in cattle before this class. Conclusion: This online course can be used to increase the confidence level of the student's cognitive knowledge and skills after completion of the curriculum. The online offering of this course is an effective method to educate any interested agricultural science students in the United States on topics specific to pharmaceutical use in cattle.

**Key Words:** cattle, pharmaceuticals, education

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**1959 (W389) Using community engagement to enhance student learning in animal science: Farm to fork-at home and abroad.** T. Montgomery\*, *University of Wisconsin-Platteville, Platteville*

Community engagement in the animal sciences takes many different forms. Our Pioneer Academic Center for Community Engagement (PACCE) was founded as a way to help faculty from all across campus to engage students with community

partners to increase learning opportunities that involve problem-solving. PACCE projects are funded through segregated student fees and allow each faculty member to design projects that will engage students without a significant financial burden on the course. Many disciplines, such as engineering and business, have community partners looking for the specific expertise of the course and the students within. Animal science courses have historically been less able to attract community partners and so we have had to seek them out more intentionally and controversy exists as to whether this approach compromises the engagement process. Surveys and interviews were conducted in animal science, agribusiness, and agriculture engineering technology to determine if differences in approach to finding community partners changed the experiences and outcomes for faculty, students, and community partners in the different disciplines. From on-farm projects creating standard operating procedures to exploring ice cream flavors for a local business to doing community service during study abroad experiences (such as Ghana and Romania), students that engage in these activities have an increased investment in the course, a greater sense of civic responsibility, and an overall awareness of how they fit into the larger community regardless of discipline. Community partners felt equally engaged throughout the projects. Struggles for faculty include finding time to organize these projects as well as garnering acceptance from colleagues that these projects are worthy of the same weight as grant-writing and research publications.

**Key Words:** community engagement, study abroad, farm to fork

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**1960 (W390) An animal handling course for today's animal science student.** A. P. Fidler\*, *University of Arkansas, Fayetteville*

An increasing number of students with limited exposure to animal husbandry and plans to practice companion animal veterinary medicine are enrolling as Animal Science majors at the University of Arkansas. Without adjusting the curriculum to reflect the needs of the incoming student body, the department is at risk of graduating students lacking the knowledge and skills expected of an Animal Science graduate. Chief among those is the general livestock husbandry principles and practices which previous generations of animal science students might have been expected to already have become familiar with before matriculation. Simultaneously, the knowledge base and technologies continues to grow in a number of animal science disciplines, necessitating their inclusion into courses in our curriculum, often at the expense of the more time-consuming and logistically difficult live animal handling laboratory experiences. To address this disparity, a course has been developed at the University of Arkansas to provide animal science students with the opportunity to learn and practice safe and humane animal handling, restraint, and husbandry procedures of a variety of domestic species. The course uti-

lizes live animal demonstrations and hands-on activities with cattle, horses, sheep, swine, dogs, cats, and laboratory rodents. Students learn methods of safe, effective, and humane handling and restraint as well as typical husbandry procedures which may be performed by an animal scientist. Examinations combine a written portion to test comprehension of basic principles as well as a practical portion to test ability to perform basic procedures. Students are thereby given the opportunity to learn, practice, and demonstrate animal handling knowledge and skills that may be lacking in their previous experience or academic history.

**Key Words:** handling, husbandry, student

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**1961 (W391) Experiential learning experience for undergraduate students in livestock and fisheries work in India.** S. Robinson, M. Shelby, C. Prakash, O. Bolden-Tiller and N. Gurung\*, *Tuskegee University, Tuskegee, AL*

The Tuskegee University (TU), as a collaborating partner, for the Agricultural Innovation Partnership project funded by USAID in India with Cornell University as the lead institution, was responsible for developing new and enhancing existing animal science courses at select Universities in India for advanced learning to prepare market ready students to improve their employability with market knowledge and market access as well as to develop curricula to address the needs of small and landless farmers to improve their livelihood. Three faculty members and two undergraduate students from TU travelled to India in December of 2012. The project partners in India were Sardar Vallabhbhai Patel University of Agriculture and Technology (SVPUA&T) in Meerut, India, Banaras Hindu University (BHU), Varanasi, India and Assam Agricultural University in Guwahati, India. Over the project period, the team assisted with the development of new curriculum and revised the existing curriculum in animal science and veterinary science programs, diplomas, certificate programs and experiential learning programs. Based on our work, the BHU launched a program for Bachelor of Veterinary Science and Animal Husbandry (B.V.SC. and A.H) effective July 13, 2013. Two other short courses were successfully completed in the hygienic production of milk-based desserts and vegetable processing at BHU. Since 2010, several faculty exchange visits have been made between Tuskegee University and SVPUA & T and BHU. The faculty members from India spent several weeks in the US for developing new curricula and improving the exiting one. In addition to the curricula development for the Indian universities, The TU students visited numerous fish markets, both dry and wet, becoming sensitive to the challenges faced in post-harvest processing, value addition and marketing for such markets in India. Further, TU students observed first-hand various challenges facing animal production systems in rural India. Students prepared white papers describing their international experiences with comparisons of challenges faced by

limited resource producers in rural America (Alabama Black Belt). Collectively, these experiences provided and continue to provide a platform for enhanced intellectual consideration in their training subsequent to the program.

**Key Words:** experiential learning, undergraduate students, livestock, fisheries

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**1962 (W392) *Fine Focus*: A new international journal for undergraduate microbiology research.**

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The American Association for the Advancement of Science (AAAS) recently disseminated a call to action underscoring the need for a re-evaluation of undergraduate biology education. Development of creative student-centered research into existing curricula is a major theme of this announcement, as well as 'community-based participatory research.' Ball State University is well positioned to take advantage of many of these rapidly evolving objectives in undergraduate science education, largely due to an established track record of excellence through our Biotechnology Certificate Program, an active Chapter of Sigma Xi (the Scientific Research Society), and the only ASM chapter in Indiana. This proposed immersive learning course utilizes the skill sets of 12 undergraduates in four departments to develop a peer-reviewed jour-

nal that will publish findings of undergraduate microbiology research internationally. This journal, entitled *Fine Focus*, will be the first of its kind, and will be produced in print form and electronically. Participating students gain a multitude of experiences through collaborations with professionals from ASM National and other professional coalitions. Such experiences will include acquisition of a working knowledge on scientific writing, editing, peer review, graphic design, and advertising, as they relate to dissemination of microbiological research data through an academic journal with international scope. Students will leave the course having also established permanent professional contacts in varied subdisciplines of microbiology worldwide. To be successfully implemented, contemporary undergraduate research in the biosciences must incorporate not only the bench skills, and experimental design principles, but the other vital aspects of doing original research, including professional dissemination. It is this unique niche that *Fine Focus* will fill. Our proposed work here is the first undergraduate journal specifically in microbiology. In a time when limited research budgets prevent undergraduates from attending national conferences to present their data, a venue such as *Fine Focus* allows interested students the opportunity to see their research efforts to fruition and learn about the entire research process at the same time.

**Key Words:** undergraduate research, microbiology, immersive learning, peer-review