M347 An introductory animal cell culture course for animal science, biomanufacturing and biotechnology programs. P. E. Mozdziak*[1,2], J. N. Petitte[1,2], and S. Carson[1], [1]*Biotechnology Program, North Carolina State University, Raleigh*, [2]*Biomanufacturing Program, North Carolina State University, Raleigh*.

Animal cell culture is a core technique in many molecular biology, developmental biology, and biotechnology laboratories. It is also a core laboratory technique for biomanufacturing. The traditional methodology for acquiring cell culture training has been through trial and error, or instruction when hired for a specific cell culture position. However, cell culture is a critical course for any biotechnology-related training program because it is a technique that must be performed by investigators before they perform many molecular procedures. In addition, vertebrate cell culture is becoming increasingly important for biomanufacturing of therapeutic proteins. Therefore, a cell culture techniques course is an important offering for undergraduate students who aspire to graduate training, and those who will seek employment with biotechnology or biomanufacturing companies immediately after graduation. A core cell culture techniques course has been developed and delivered to students at North Carolina State University as a component of an undergraduate biotechnology minor curriculum, and it is now a key offering in the undergraduate biomanufacturing curriculum. The course has experienced considerable growth in both resources and enrollment. The course was first offered in 2001 with an initial enrollment of 8 students. Currently, 40 students complete the course per year. Key features of the course are acquiring practical critical reasoning skills, mastering record keeping skills, and developing effective communication skills. Subsequent courses in tissue engineering technologies, animal cell culture engineering, bioreactor culture, and stem cell technology serve as specialized follow-up topics to the introductory animal cell culture course.

Key Words: cell culture, undergraduate education, laboratory courses

M348 Justification of university equine extra-curricular activities. M. Nicodemus*, *Mississippi State University*, *Mississippi State*.

With current economic constraints University equine programs are forced to make cutbacks in their equine faculty and teaching horse herds. Equine extra-curricular activities such as equine clubs and teams are time consuming for the equine faculty and costly to the departments supporting such activities, and while these activities are popular recruiting tools for incoming freshmen, it does not reflect the participation of the students once they are enrolled in the University. Student participation is essential for justification for continuation of such activities. To determine student interest in the equine extra-curricular activities supported by the Animal & Dairy Sciences (ADS) department once students are enrolled in Mississippi State University, students (n=80) enrolled in equine courses were asked to fill out a researcher-developed, 9-item survey instrument with questions focusing on student academic and extra-curricular activities. 67% of those students that returned a survey were ADS majors with 50% of the students classified as underclassmen (freshmen or sophomores). 64% of ADS major and 13% of non-ADS majors had taken an equine course in a prior semester. While 26% of ADS majors and 10% of non-ADS majors were members of the University equine club, 60% of ADS majors and 70% of non-ADS majors were interested in becoming an equine club member. Similarly, although only 22% of ADS majors and 10% of non-ADS majors were competing members on an equine team (equestrian or rodeo team), 66% of ADS majors and 44% of non-ADS majors planned on competing on a team the following competition season. 68% of students currently participating or were planning to participate in an equine extra-curricular activity and that were not graduating at the end of the semester were planning to take another equine course in the following semesters, and of those students, 46% were students outside of the department. While memberships were small, intended participation in equine extra-curricular activities was strong and this continued growth in participation keeps students, particularly those outside of the ADS department, actively involved in the equine program.

Key Words: equine teaching programs, equine clubs

M349 A practical stem cell culture course for agricultural, life science, and engineering students. J. N. Petitte*[1,2], P. E. Mozdziak[1,2], and S. Carson[1], [1]*North Carolina State University, Biotechnology Program*, *Raleigh*, [2]*North Carolina State University, Biomanufacturing Program*, *Raleigh*.

During the last 20 years, the culture of stem cells has grown from a few laboratories utilizing embryonic stem cells for manipulation of the mouse genome to a field of science encompassing stem cells from embryos and adult tissues with a myriad of applications in biology, medicine, and engineering. Therefore, practical skills in the culture of stem cells of various types and sources is destined to become a fundamental aspect of animal cell culture in the future. Therefore, as a subsequent course to basic undergraduate animal cell culture, a practical course in the culture of stem cells was developed and offered to students at North Carolina State University as an elective component to an undergraduate/graduate Biotechnology minor. The course includes lectures to describe the historical development of stem cell biology and provides laboratory experience in the culture of embryonic stem cells and germ line stem cells. Lectures cover the establishment and characterization of embryonic stem cells, germ line stem cells, and adult stem cells. Subsequent lectures encompass the differentiation of stem cells and their therapeutic and industrial applications including ethical considerations of the technology. Laboratory exercises include culture systems for stem cells, growth factors in stem cell culture, initiation, maintenance, and characterization of stem cells. Targeted student outcomes include: 1) an understanding of the historical emergence of stem cell biology and current applications of the technology, 2) practical skills in the culture of embryonic stem cells and establishment of stem cell lines, 3) processes involved in the induction of stem cells toward differentiation into committed cell types, and 4) an appreciation of the ethical issues in stem cell biology.

Key Words: biotechnology, education, laboratory course

M350 Reliability of item scores on end-of-semester departmental course evaluation. M. A. Wattiaux* and P. M. Crump, *University of Wisconsin*, *Madison*.

Our objective was to determine whether students' scores for items on departmental course evaluation were reliable (i.e., repeatable). Eighty-two students including freshmen (5%), sophomores (20%), juniors (7%), seniors (34%), graduate students (28%) and guests (6%) from six classes (with enrollment ranging from 8 to 20) taught in 2008 by the same instructor, completed a 12-item departmental evaluation

(DPT) the last day of class using a 1 (=not at all) to 5 (=very much) likert-type scale. Ten of these items were dispersed in a 40 to 50 item instructor-generated tool (INSTR) administered with students' consent for a scholarship of teaching and learning project, one week before the last day of class using the following scale: 1-2=not at all, 3-4=a little, 5-6=somewhat, 7-8=a lot, and 9-10=a great deal. Items (I) were: I1: I value the material/topic covered in this course; I2: This course stimulated my interest in the subject; I3: This course encouraged me to think; I4: I learned a lot in this course; I5: Individual class meetings or lectures were well planned and effective; I6: This course was well organized and provided coherent understanding of the subject; I7: Useful supplementary materials were available outside of class; I9: The instructor was approachable and seemed to enjoy teaching; I10: The grading system was appropriate, clearly explained and fairly applied; I12: Overall I rank this class: (1=lowest 20% to 5=highest 20%). The I1 to I10 scores of the INSTR tool were re-categorized on a 1 to 5 scale before analysis with proc ANOVA of SAS. The overall score for INSTR and DPT tool was 4.2 and 4.1, respectively ($P=0.25$). Although scores for each item varied among courses ($P<.05$, data not shown), they were not influenced by tool (DPT vs. INSTR), except for I7 (see Table 1), which could be interpreted in different ways. Results suggest that students score unambiguous items reliably regardless of the evaluation tool's stated purpose, its item scale, the presence of distracting items, and the administration time in the last week of class.

Table 1.

Tool	I1	I2	I3	I4	I5	I6	I7	I9	I10	I12
DPT	4.3	4.1	4.1	4.0	3.6	3.8	4.2	4.8	3.9	3.9
INSTR	4.3	4.2	4.2	4.2	3.9	4.0	4.5	4.7	4.1	3.9
P value	.91	.55	.23	.32	.12	.19	.02	.18	.16	.82

Key Words: assessment, SoTL

M351 Effect of instructor on use of an informal consumer sensory panel to teach students concepts related to beef palatability. J. A. Daniel*[1], S. E. Kitts[1], and T. D. Pringle[2], [1]*Berry College, Mount Berry, GA*, [2]*University of Georgia, Athens*.

This experience was designed to test the effectiveness of use of an informal consumer sensory panel to teach concepts related to beef palatability with two separate instructors. This class experience was performed for four lab sections from one semester of Introduction to Agriculture (a general education science course for non-science majors) at Berry College for a total of 56 students. The students were enrolled in two separate sections of the class and had two different instructors. Students received no classroom instruction in beef palatability prior to this lab. At the beginning of the lab, students completed a quiz (pre-quiz) consisting of 12 questions. Ten of the questions were designed to test the students' knowledge of different attributes of beef quality, and two of the questions were designed to assess students' steak preferences. A rating sheet was then distributed to the students and they were presented with the bite-sized steak samples (approximately 2x2x2 cm cubes) for evaluation. Students were asked to take a bite of cracker and drink of apple juice between each sample. After completion of the sensory panel, evaluation sheets were collected, and results and beef palatability attributes were discussed with the class. Students then completed the previously mentioned quiz (post-quiz). Scores on the 10 questions designed to test students' knowledge of different attributes of beef quality were improved ($P < 0.0001$). Thirty-five out of 56 students changed at least one of the questions related to the students' steak preference, suggesting application of the students' newly acquired knowledge about beef palatability. Although there were significant differences in scores between lab sections, the differences did not appear to be due to instructor (the same instructor taught the lab sections with the highest and lowest post-quiz score). Thus, instructor does not appear to impact the effectiveness of the use of a consumer sensory panel to teach concepts related to beef palatability.

Key Words: beef, teaching

M352 Factors influencing student success in an introductory to animal science class. F. M. LeMieux*, T. H. Shields, and J. T. Compton, *McNeese State University, Lake Charles, LA*.

This study was conducted to determine factors that influence student performance in a traditional undergraduate Introduction to Animal Science class at McNeese State University. The study consisted of students enrolled (n = 133) over a 3 yr period (2006, 2007, and 2008) in a weekly 150 min lecture and 170 min laboratory covering basics of animal genetics, nutrition, reproduction, behavior, growth and development, and industry production systems. Gender, American College Testing (ACT) scores, animal experience, team involvement, major or concentration and participation in study sessions were evaluated to determine successful completion of the course. Female students (n = 65) performed better ($P < 0.05$) on tests and final course grades than male (n = 68) students. The average ACT score was 21 (range 14 to 28); students with increasing numerical ACT scores performed better on examinations and final grades. Prior animal experience was determined by a student survey, categories were 0 - no experience, 1 - companion animal, 2 - equine, and 3 - large animal (cattle, goat, sheep, or swine). Students with previous companion and large animal experience had the highest scores on examinations and final grades. Informal study sessions were offered before each examination. The instructor and a graduate assistant were available to answer questions and work problems for students. Study sessions lasted between 60 and 120 min. Students that participated in the session had higher ($P < 0.05$) test and final course grades. Students choosing the agricultural concentrations (Animal Science, Pre-Vet, Equine, and Agricultural Business) performed better ($P < 0.05$) on exams and subsequently final grades compared to Wildlife Management and Undecided students. Females, students with large and companion animal experience compared with those with previous equine experience or no animal experience, higher ACT scores, or participated in study sessions were more successful in an undergraduate introductory to animal science course.

Key Words: undergraduate, gender, ACT

M353 Introducing a "Nutritional Physiology Webinar" for animal scientists. K. J. Harvatine*, *Penn State University, University Park*.

With increasing specialization of researchers and decreasing size of Animal Science departments it has become difficult to sustain metabolism and nutritional physiology based seminars at many institutions. The "Nutritional Physiology Webinar" was created to provide a forum for departments without an active seminar and to complement existing seminar programs. Three beta-test webinars were hosted during Fall 2008 with a limited audience to test software and fine tune the approach. The webinar is hosted from a web-based platform. The speaker and audience members log into the webinar via a web browser and do not need to purchase or install additional software. The slide presentation

is displayed in the browser and the speaker has real-time control of the presentation and may use a suite of presentation aids including a white board, a pencil to draw on slides, and a pointer. Audio of the speaker and up to three participants is also broadcast through the web browser. Audience members participate by typing in a chat box or by having a microphone "passed" to them. In the current format speakers have presented a recently published paper or group of related papers that are of interest to animal nutritionists. Future webinars are expected to follow a similar format and possibly include invited speakers from outside the animal nutrition community. The webinar has the potential to promote dissemination of new concepts in nutrition and to stimulate collaboration between research programs. The expected impact will benefit training of students and further the progress of animal nutrition research.

Key Words: webinar, nutritional physiology, seminar

M354 Assessment of needs for teaching, research and extension for goat sector. S. Solaiman*, C. Hill, N. Gurung, O. Bolden-Tiller, and C. Okere, *Tuskegee University*, *Tuskegee, AL*.

A web based data search was conducted to assess current status for goat teaching, research and extension. Four different search engines, PubMed, PubMed Central, USDA website, and Agricola were used to retrieve number of records for goats. Key words used were goat, types of goats (dairy, meat, fiber), and production. Goat production was further defined as goat reproduction, genetics, parasites, immunity, and nutrition. Goat nutrition was searched for protein, energy, minerals, and vitamins. The website for more than 70 Land grant Universities' courses offered in Animal Sciences in 50 States and 7 US Commonwealth and Territories, were searched. Also number of records for goats, sheep and cattle for different management and production parameters were determined. The number of courses taught on Sheep and Goats, Small Ruminants, or Sheep Science/Production were 20, of which 16 (75%) were on sheep only. There was no course taught on goats only. The number of records for goat teaching produced only 3 hits, while for sheep and cattle were 4 and 12 folds higher, respectively. The number of records for goat research in all categories was much smaller than sheep and cattle except dairy goats and milk that were researched more than dairy sheep. According to the search, it is clear that within goat types, dairy goats have been investigated more than meat or fiber goats in all areas of goat production. Within production area, more data is available in the areas of reproduction and genetics followed by nutrition. In the area of nutrition, protein nutrition resulted in more records followed by energy nutrition. Energy nutrition of fiber goats has received more attention than other areas of their nutrition. Records on goat immune, vitamins and minerals are very limited. Search for extension and goats, resulted in higher numbers of records as compared to teaching. Similar records for sheep and cattle were 2 and 15 folds higher than goats, respectively. In conclusion, information regarding teaching, research and extension for goats are lacking and presents a challenge for educators and extension personnel in this sector of agriculture.

Key Words: goats, research, teaching

M355 Preferences and backgrounds of incoming students in animal sciences at Tuskegee University. O. U. Bolden-Tiller*, E. Bush, and S. Bruinton, *Tuskegee University*, *Tuskegee, AL*.

Statistics on African American students in the field of Animal Sciences are not readily available as the majority of said students attend 1890 Land Grant Institutions, which except for one do not have Departments of Animal Sciences. As universities, industry, and government work to diversify their workforce in the field of Animal Sciences, many are unclear as where to find well trained underrepresented students to meet the diversity demand. The Animal, Poultry, and Veterinary Sciences program within the Department of Agricultural and Environmental Sciences at Tuskegee University (TU) boasts one of the largest numbers of undergraduate African American students majoring in the field. The current report demonstrates that large numbers of African American students are interested in pursuing careers in the field of Animal Science. Here 100 minority students (77% Female, 33% Male) enrolled in the Orientation to Animal, Poultry, and Veterinary (APSC 100) course at TU were surveyed. Eighty percent of the students were 17-18 years of age with becoming a veterinarian as a 1st career choice. Sixty-five percent of the students reported their species of interested to be companion animals with horses coming in 2nd at a distant 13%. Forty-seven percent reported that their 1st choice for attending TU was with aspirations of attending the TU School of Veterinary Medicine with the appreciation of the university's history second at 6%. Of the students surveyed, 17% had attended Vet-Step, a two-week summer enrichment program at TU for high school students interested in veterinary medicine. Fifteen percent of the students had attended similar programs elsewhere. Only 19% were from rural areas. Forty-three percent had worked with a veterinarian; 62% had worked with companion animals. Only 23% had interacted with non-companion animals. In conclusion, incoming students majoring in Animal Sciences at TU have similar backgrounds and preferences of those at other institutions.

Key Words: undergraduates, minorities, diversity