

## Teaching/Undergraduate & Graduate Education: Visual Learning in Animal Science

**173 The role of the NSF/National Science Digital Library in the dissemination of science, technology, engineering and mathematics information and in support of innovations in teaching and learning.** L. Salisbury\*<sup>1,2</sup>, <sup>1</sup>University of Arkansas Libraries, Fayetteville, <sup>2</sup>National Science Digital Library.

The National Science Digital Library (NSDL) was created by the National Science Foundation to provide organized access to high quality resources and tools that support innovations in teaching and learning at all levels of science, technology, engineering, and mathematics (STEM) education. NSDL was established by the National Science Foundation (NSF) in 2000 as an online library where users can find exemplary resources to assist them in STEM instruction, education and research. The digital library provides an organized point of access to high quality STEM content that is aggregated from a variety of other digital libraries, NSF-funded projects, and NSDL-reviewed web sites. In this context, NSDL serves both as a focal point for access to and the dissemination of research results. This presentation will highlight key resources in the NSDL that will be useful in poultry and animal science research, instruction and education. It will also showcase the huge set of quality resources for teaching and instruction in general biology. The services and tools that enhance the use of the NSDL content in a variety of contexts will also be explored. This presentation will also introduce the audience to ways of participating in the National Science Digital Library, including methods for contributing resources and collections.

**Key Words:** National Science Digital Library, Science Information, Technology Information

**174 The importance of images to the pork industry.** D. J. Meisinger\*, *US Pork Center of Excellence, Ames, IA.*

The mission of the US Pork Center of Excellence is to add value to the pork industry by facilitating research and learning for U.S. pork producers through national collaboration. The USPCE is bringing states together in a collaborative mode to accomplish many things in research, teaching and extension. The newest tools include the Pork Information Gateway or PIG which is a virtual library of resources and information on all aspects of swine and pork. PIG has peer-reviewed fact sheets, numerous other information pieces, about 2000 frequently asked questions, an events calendar, a glossary and a small image library. The latter contains only about 80 high resolution images that are all acceptable for any audience. The facilities pictures, for instance, show white buildings, blue skies, blue lagoons, etc. Because the images are all high resolution, they lend themselves to print quality for publications while also working well on presentations. Another tool available only to educators is the PIG Media Asset Portal or PIGMAP. This tool has over 4500 images but is held closely. Many of the images of unhealthy pigs or environmental situations would not be acceptable used outside of our industry. That is the reason for restricting the site only to registered users. The images are classified according to one of sixteen different categories. The intent is to not only expand the image inventory but also to add other materials such as PowerPoint presentations, movie clips, audio clips, and activities. Educators have found the image library, even in its rudimentary state, an excellent tool for developing classroom lectures or presentations for producer meetings, developing a newsletter, graphically demonstrating

to make a point, etc. Equipping educators has an expanded effect due to the fact that the educator has a reach throughout the industry having exposure to many pork producers. The USPCE has the philosophy in all its areas of work that the more venues in which materials are presented, the better the opportunity to reach a maximum number of producers. To meet this end, there is an effort to transfer as many of the innocuous photos as possible into the Animal Science Image Gallery.

**Key Words:** Swine Images, Pork Information Gateway, PIGMAP

**175 Image coupling – simplifying and linking information for enhanced learning.** S. Gerard<sup>1</sup>, A. C. Oki<sup>2</sup>, and P. L. Senger\*<sup>2</sup>, <sup>1</sup>Oei Graphics, Bellevue, WA, <sup>2</sup>Current Conceptions, Inc., Pullman, WA.

Teaching concepts in reproductive science usually follows a sequence in which anatomy is presented first, followed by hormonal responses by the target tissue. Although this sequence is well accepted, it does not easily allow anatomy and hormone responses to be coupled into concise, visually powerful images. Images in reproductive science generally follow two primary forms: photographs of anatomical specimens and two-dimensional graphics that are intended to convey time-related mechanisms and events. Complex two-dimensional graphics typically are presented "all-at-once" with no defined starting or ending point. Such images are often visually overwhelming when presented on a screen because there is too much information presented in a short period of time. We have developed a series of PowerPoint images (n = 1,100) that present complex anatomical and graphic information in a step-wise, animated fashion. This approach allows each graphic to be presented with a defined beginning and a defined conclusion and the instructor can "build" complex images in a logical, step-wise sequence, thus simplifying them. Further, the instructor can "back-up" to reemphasize or clarify points. We have also utilized Flash animation to further enhance the explanation. For example, ovarian structures can be visually added to the graphic so that the viewer observes an image that contains anatomical structures, hormone profiles and responses to hormones in one well-sequenced, step-animated series of images. Application of this technology can facilitate learning in a wide variety of disciplines. Image "building" and coupling was used for two semesters in a reproductive science course involving over 140 students. While not quantified, the following changes in student behavior were observed: 1) fewer students took notes and concentrated on the content of the lecture; and 2) questions transitioned from simple clarification of minor points to clarification of entire concepts.

**Key Words:** Image, Reproductive Science, Education

**176 Digital Image Gallery to assist learning animal science: Photos and illustrations solicited.** J. W. Riesen\*<sup>1</sup>, H. D. Hafs<sup>2</sup>, G. K. McCone<sup>3</sup>, P. A. Schoknecht<sup>4</sup>, and M. R. Stokes<sup>5</sup>, <sup>1</sup>University of Connecticut, Storrs, <sup>2</sup>Rutgers University, New Brunswick, NJ, <sup>3</sup>National Agricultural Library, Beltsville, MD, <sup>4</sup>Wagner College, Staten Island, NY, <sup>5</sup>University of Maine, Orono.

To assist teaching baccalaureate level Animal Sciences, we are accumulating digitized images and animations at <http://>

anscigallery.nal.usda.gov. Sections for Beef Cattle, Companion Animals, Dairy Cattle, Ethology, Horses, Nutrition, Other Species, Pork Industry, Poultry, Reproduction, and Sheep and Goats are already installed. The potential exists to add additional sections. Instructors, researchers and graduate students everywhere are encouraged to contribute their images. Submitted images with descriptions and metadata are peer reviewed to insure accuracy and optimize their use in learning. Submitters are giving their permission to use the images for teaching purposes, but have the option of requiring a credit line when they are used. Submitters also have the option to put images in the public domain. ASAS manages the peer review process. The National Agricultural Library (NAL) manages the Image Gallery website where the images are available in perpetuity and without cost. The gallery uses the NAL thesaurus, includes a glossary, and is searchable either by keyword or by advanced search methods. Images can be downloaded in one of several resolutions. This co-operative effort makes free high quality, peer reviewed images easily available to instructors without the danger of copyright infringement. As of 2/2007 over 300 images are available on the website with more in the process of submission and review.

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**Key Words:** Image Gallery, Teaching, Learning

**177 ASAS operational structure for the animal science image gallery.** M. C. Wulster-Radcliffe\*, *American Society of Animal Science, Savoy, IL.*

The goal of the Animal Science Image Gallery is to continue to develop a digital image database housed on servers at the National Agricultural Library (NAL), to assist animal science instructors and their students. Animations, videos, data sets, and other teaching tools are solicited, particularly when single images are inadequate for difficult concepts. The NAL indexing system ensures that adequate metadata are included for each image. NAL will make the images available in perpetuity without charge to those who submit or use the images. While NAL will maintain the Image Gallery in perpetuity, they are not prepared to assess new images arising out of new discoveries or technical advances. American Society of Animal Science (ASAS) members possess the expertise to select new images for the Gallery, and they have peer review experience. Therefore, ASAS will assume logistical management of the Image Gallery in October 1, 2007. ASAS will establish an Image Gallery Editorial Board within ASAS. The Editorial Board will be constituted and operated similarly to that for the Journal of Animal Science. The Editorial Board for the Image Gallery will fall under the venue of the ASAS Publications Committee. Initially, the Board will consist of the current Image Gallery editors, as some have volunteered to serve beyond September 30, 2007. Each Section Editor will be encouraged to form a Steering Committee to a) set policy and b) solicit images. To ensure quality, each image and its metadata will continue to be peer-reviewed, much as papers are peer-reviewed for a scientific journal. The Gallery web site <http://anscigallery.nal.usda.gov/> currently has instructions for submission and review of images. The major changes over the next several months will lead to more formal incorporation of ASAS review policies. With volunteer section editors and reviewers, the Image Gallery adopted the journal paper review model. The current volunteer editors and reviewers have validated this model. As NAL will provide the computer resources for the

Gallery, the main responsibility for ASAS would be recruiting and organizing editors.

**Key Words:** Image Gallery, Teaching

**178 The OSU Breeds of Livestock Library.** D. S. Buchanan\*, *Oklahoma State University, Stillwater.*

At about the time that the internet started to become part of the life of animal scientists, we had the idea that people might enjoy a resource on breeds of livestock. The first thought was to make a library on CD but, at the time, making a master CD was prohibitively expensive (an indication of just how much times have changed). So we turned to the internet as a location for this library. We contacted all of the breed associations that we knew anything about and asked for a description of the breed and some photographs. Response was slow but we started presenting the breeds for which we had information. Some most popular breeds did not send us information and we started getting emails from people who wondered why we did not have some of these breeds. In order to illustrate that we did know that these breeds existed, we constructed a site for each of them and just placed a statement in each site requesting information. Several breed associations contacted us with a query as to why we had not contacted them. We were able to tell each one that we had sent a letter but that they had never responded. Many responses followed quickly. The library grew rapidly and now contains more than 1000 breeds of cattle, swine, horse, sheep, goats, chickens, turkeys, ducks and geese. The library is one of the most heavily used sites at our university. Several of the pages receive in excess of 10000 hits per month. Many of the most popular pages are horse breeds (e.g. Arabian, Quarter Horse, Palomino). The pages include a link for comments. There are typically six to ten comments per day. Some of the comments are requests to use the images in other venues. We allow use of the images for educational, not-for-profit purposes. We receive a few comments every week that are asking us to update a page. In addition, a substantial portion of the comments are just random comments such as "I like horses" or "Eating animals is cruel". The most interesting comments are from teachers and students. We have realized that these pages are used in schools across the United States and in other countries. Such schools are, in many cases, in urban areas and these pages are providing an opportunity for students to learn about Animal Agriculture.

**Key Words:** Breed, Livestock, Internet

**179 Images for animal breeding, archives, extension, and poultry.** D. S. Buchanan\*<sup>1</sup>, G. E. Dahl<sup>2</sup>, J. B. Hess<sup>3</sup>, and G. K. McCone<sup>4</sup>, <sup>1</sup>*Oklahoma State University, Stillwater,* <sup>2</sup>*University of Florida, Gainesville,* <sup>3</sup>*Auburn University, Auburn, AL,* <sup>4</sup>*National Agricultural Library, Beltsville, MD.*

Presently, how vision contributes to cognition is a major field for research in psychology and neuroscience. Nevertheless, good teachers have understood that visuals facilitate learning, and the advantages of images for learning in less structured environments such as outreach likely exceed those used in classrooms. While the on-line Dairy courses offered for credit by the University of Illinois use some real-time audio-visual interactions between instructors and students, images are critical because the majority of the learning is visual without active

interactions. Increasingly, those who specialize in archival information enhance their holdings with images. For example, the liberal use of images in the holdings within the Animal Welfare Information Center (AWIC, <http://awic.nal.usda.gov/>) at the National Agricultural Library (NAL) significantly enhances information transfer. As another kind of example, NAL now facilitates use of many of their holdings such as those in AWIC through the National Digital Library for Agriculture which provides easy access to up-to-date authoritative agricultural

information, data, and services for consumers, policymakers, researchers and other agricultural specialists, farmers and other agribusinesses, libraries, educational institutions, and the general public. Images have proven to be especially useful to preserve historical information, such as the Poultry historical images now being assembled. The “Breeds of Livestock” and “Breeds of Poultry” web sites (<http://ansi.okstate.edu/breeds/>) also are examples of how images efficiently enhance cognition.

**Key Words:** Vision, Images, Learning

## Graduate Student Competition ADSA Northeastern Branch - ASAS Northeastern Section

**180 The effect of microbial inoculants on the fermentation and aerobic stability of orchard grass silage.** C. M. Klingerman\*, R. J. Schmidt, W. Hu, E. E. McDonnell, and L. Kung, Jr., *University of Delaware, Newark.*

Microbial inoculants were tested for their effects on the fermentation and aerobic stability of silage. Wilted orchard grass (about 38% DM) was chopped and treated with A) nothing, B) a “grow up” culture (*Lactobacillus lactis* and *L. plantarum* AberF-1 with the ability to ferment fructose), C) a low dose of a dry formulation of B, D) a high dose of a dry formulation of B, E) Sil-All 4 × 4 inoculant (*L. plantarum*, *Pediococcus acidilactici*, *Enterococcus faecium* and *Bacillus pumilis* and amylase enzymes), F) Pioneer 1127 inoculant (*L. plantarum* and *E. faecium*), G) Biomax Multipurpose inoculant (*L. plantarum* and *P. pentosaceus* and H) *L. buchneri* and *P. pentosaceus*. The sources of products were: B, C and D (ABS Global, DeForest, WI), E (Alltech, Nicholasville, KY), F (Pioneer, Johnston, IW), G (Chr. Hansens Biosystems, Milwaukee, WI) and H (Lallemand, Milwaukee, WI). Silages were packed in vacuum/heat-sealed pouches. Data were analyzed separately for each time point using the PROC GLM procedure of SAS for a completely randomized design. After 90 d of ensiling, the concentrations of lactic (ave. 6.04%) and acetic (ave. 0.43%) acids were higher and lower, respectively, in silages B through G when compared to that of A (4.71% and 1.93%) ( $P < 0.05$ ). Silages B through D had less NH<sub>3</sub>-N (ave. 0.07%) than A and H (0.14%) ( $P < 0.05$ ). Silage H had the least lactic acetic (1.53%) but most acetic acid (6.58%) compared to all other silages ( $P < 0.05$ ). Silages B through G had more yeasts ( $> 5.5 \log \text{ cfu/g}$ ) than did A (2.76  $\log \text{ cfu/g}$ ) and H (0.85  $\log \text{ cfu/g}$ ). Aerobic stability was worse for silages B through G (ave. 42 h) but better for H (400 h) compared to A (178 h) ( $P < 0.05$ ). Dry matter recovery was lowest for H ( $P < 0.05$ ) and similar among other silages. Homolactic acid-based silage inoculants can improve silage fermentation but can make aerobic stability worse. An inoculant containing *L. buchneri* had the best aerobic stability but lowest DM recovery of all treatments. A “grow up” inoculant with the ability to ferment fructose improved the early rate of fermentation but final silage quality was generally similar to that from other treatments after storage.

**Key Words:** Silage, Forage

**181 Effects of feeding alfalfa silage at two levels with and without Rumensin to high producing Holstein cows on animal performance.** C. M. Martinez\*, Y. H. Chung, T. W. Cassidy, V. Ishler, K. S. Heyler, and G. A. Varga, *The Pennsylvania State University, University Park.*

Eight multiparous high producing Holstein cows (BW=699 kg  $\pm$ 13; DIM=158 d  $\pm$ 4.5) were used in a replicated 4x4 Latin Square design with a 2x2 factorial treatment arrangement to evaluate the effects of feeding two levels of forage inclusion with and without Rumensin on dry matter intake, milk production, milk composition and blood metabolites. The diet was formulated to contain 50 or 60% forage (DM basis) in which alfalfa haylage comprised 55% and corn silage comprised 45% of the total forage in the diet. Rumensin was top dressed at a rate of 300 mg/cow/d. The length of each period was 4 wks and samples were collected during the last wk. Dry matter intake was higher ( $P < 0.01$ ) for cows consuming the 50% forage diet than for cows consuming the 60% forage diet (29.6 vs. 27.3 kg/d, respectively). Milk yield and fat corrected milk (46.4 and 46.6 kg/day, respectively) were not affected by forage level or Rumensin in the diet. Milk fat % increased with forage level (3.39 and 3.51% for 50 and 60% forage, respectively,  $P < 0.05$ ). However, a significant forage level by Rumensin interaction was observed showing that Rumensin decreased milk fat % for the 60% forage diet with no effect on milk fat % for the 50% forage diet. Cows consuming the 50% forage diets had higher ( $P < 0.05$ ) milk protein % (3.12) than cows consuming the 60% forage diets (3.07). Milk protein % was lower for Rumensin-fed cows (3.07) compared to no Rumensin (3.12). Neither fat nor protein yields were affected by forage level or Rumensin. Cows consuming the 60% forage diets had a higher ( $P < 0.05$ ) feed efficiency (1.71) when compared to the 50% forage diets (1.56). Blood glucose was higher for cows receiving 50% forage than cows receiving 60% forage (69 vs. 65 mg/dL, respectively). Results from this study suggest that higher forage levels can be achieved in dairy cow rations without affecting milk production while improving feed efficiency compared to lower forage inclusion. When feeding alfalfa silage based rations supplemented with Rumensin, milk components may be altered dependent upon forage level in the diet.

**Key Words:** Rumensin, Alfalfa, Forage level

**182 Trans-7-octadecenoic acid decreased milk fat and altered CLA composition in milk of lactating mice.** A. K. G. Kadegowda\*<sup>1</sup>, B. B. Teter<sup>1</sup>, J. Sampugna<sup>1</sup>, P. Delmonte<sup>2</sup>, L. S. Piperova<sup>1</sup>, and R. A. Erdman<sup>1</sup>, <sup>1</sup>University of Maryland, College Park, <sup>2</sup>Food and Drug Administration, College Park, MD.

Principal component analysis of data from studies with MFD in cows has indicated that trans-7-18:1 (t-7) could be associated with regulation of milk fat synthesis. We used a lactating mouse model to compare the effects of t-7-, t-9-, t-11-18:1, t10c12 CLA (Sigma Chemicals, Co.,