

**IN THIS ISSUE:** Swine Enrichment • The Beneficial Effects of Enrichment on Diabetic Mice  
**INTERPRETATION OF SOCIAL HOUSING FOR NONHUMAN PRIMATES • Enriching Programs**  
**THE ENRICHMENT EXTRAVAGANZA MOVES TO ATLANTIC CITY • Meeting Up!**

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We welcome your comments, observations and contributions to *The Enrichment Record*. Contributors include lab animal veterinarians, principal investigators, animal care staff, animal behaviorists, animal technologists and members of the bioscience community who promote the 4 Rs: reduction, replacement, refinement and respect.

Share your story ideas with Rhoda Weiner, Editor at [rmbw19@verizon.net](mailto:rmbw19@verizon.net)

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### Please give credit where credit is due.

Outstanding animal care is truly a team effort, and we ask you to credit colleagues, published reports, articles, and other reference materials that have contributed to your enrichment article. Great ideas don't happen in a vacuum, and we encourage you to list all sources of inspiration.

*The Enrichment Record* is not a peer-reviewed journal. However, the Editorial Board of this E-Zine is composed of dedicated volunteers who have extensive experience and expertise in the care of laboratory animals. Members of the Board are involved with all aspects of this publication.

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### COVER PHOTOS:

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Alison Grand, Jamie Pham, Kelli Barnett and Kelsey Finnie



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## New Resource

### National Institutes of Health • Office of Extramural Research

**Office of Laboratory Animal Welfare (OLAW)** has a new online resource for information on nonhuman primate enrichment and social housing. This resource is provided to assist institutions in enhancing the care and well-being of nonhuman primates. You can find new FAQs, a special online seminar, the OLAW report visits to Chimpanzee facilities, a bibliographic guide developed by USDA, NAL, AWIC and more.

### Nonhuman Primate Enrichment and Social Housing Resources

[http://grants.nih.gov/grants/olaw/primate\\_enrichment-social\\_housing.htm](http://grants.nih.gov/grants/olaw/primate_enrichment-social_housing.htm)  
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## In Other Words



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**Sharing data on the impact of environmental enrichment on the science**

**Building the case for integrating enrichment into research design**

Greetings and warmest wishes for an exciting New Year.

**The Enrichment Record** is now officially a bratty 2-year old, but we don't foresee anything terrible in our future. We may be a toddler, but we are racing ahead, curious, confident and eager to play well with all the other kids. In fact, we are all about sharing our toys and delicious treats!

The year ahead holds many exciting programs focused on enrichment. We are pleased to be co-sponsoring **The Enrichment Extravaganza** on June 13 at the Atlantic City Convention Center where the first winners of our **Enrichment Rising Star Awards** will be featured participants.

This national award program is designed to identify young scientists conducting their own research on environmental enrichment for lab animals. The EE will become a forum for these outstanding "rising stars" to share their work and stimulate a broad audience eager for the latest information to help them improve the welfare of the animals in their care.

We are working on a new digital format for this E-Zine. Like many publications trying to reach animal care staff, we are aware of work-related obstacles. For example, many of our potential readers do not have computer-access during the day and they only see **The Enrichment Record** if a supervisor chooses to download the PDF version and print it out. We welcome suggestions for reaching as many readers as possible and invite techies and others concerned with sharing information to think about new and better ways to communicate.

In other words, how can we get the word out to all the people who want to hear what we have to say?

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## The Beneficial Effects of Enrichment on Diabetic Mice

In the last issue of *The Enrichment Record*, Emily Patterson-Kane and I reported on the work (Cao, Liu et al.) in which investigators demonstrated that even short-term exposure to environmental enrichment (EE) improved resistance to cancer in a number of mouse models. The authors also measured specific physiological changes in the EE mice that led to improved cancer resistance. Now, it appears that short term exposure—ten days—to EE effect measurable physiological changes associated with improved cognitive function and memory in the diabetic mice.

Type 1 diabetes has been associated with a number of brain disturbances in human patients. Pathological hippocampal changes and cognitive deficits have been observed in animal models of diabetes. In the November 2010 issue of PLoS ONE, Beauquis, Roig et al. studied the modulation of the physiological changes by environmental enrichment in a Type 1 diabetes mouse model.

Beauquis et al. studied a widely-used mouse diabetes model, in which diabetes is induced using streptozotocin. Equal numbers of diabetes-induced mice were assigned to standard conditions (SC) and enriched conditions (EC) for ten days. The EC cages were larger, had more nesting material, and a variety of toys, small plastic houses and tubes that were rearranged every two days. Similar numbers of control (non-diabetic) mice were also assigned to SC and EC. They then measured a number of physiological changes in hippocampal neurons that have been associated with aging and stress in humans as well

as cognitive and memory changes in diabetic mice. These changes were measured using immunohistochemistry techniques on brain tissue sections.

The EC diabetic mice showed enhanced proliferation, survival of newborn neurons and dendritic complexity of mature neurons compared to the SC diabetic mice. In another important finding, they observed improved brain vasculature in the EC mice. The control mice (non-diabetic) did not exhibit significant changes in these parameters in enriched or standard conditions. The authors point out that there is still a need to perform learning and memory testing of diabetic mice to link these physiological changes with behavioral changes, but they conclude that this data could represent a new approach to prevention of central nervous system complications in Type 1 diabetes patients.

The authors comment that it is remarkable that there is no complete consensus about the protocols of EE used by different research groups. Given the mounting evidence that environmental conditions have a profound effect on research results, I must agree.

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Cao, L., X. Liu, et al. "Environmental and genetic activation of a brain-adipocyte BDNF/leptin axis causes cancer remission and inhibition." *Cell* 142(1): 52-64.



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## Interpretation of Social Housing for Nonhuman Primates



In general, most of us understand that when the regulations refer to housing for nonhuman primates, the intended default is social housing. However, while attending meetings among my peers during this past year, it became evident that we all interpret the meaning of social housing very differently. Complicating matters, the USDA VMOs may have varying opinions on the subject as well.

We all agree that most nonhuman primates require regular tactile contact with conspecifics for their psychological well-being. At a recent meeting with industry peers, the question about social housing arose. One person stated that he considered social housing to be singly housed monkeys with grooming bars between them. Another stated that she believes singly housed monkeys in a room where they can see several other conspecifics constitutes social housing.

We invite our readers to join the discussion regarding what social housing means in your facility.

***How do you social house nonhuman primates at your facility?***

***Do you consider singly housed nonhuman primates in cages with grooming bars to be social housing?***

The discussion can be found on **The Enrichment Record's** LinkedIn page.

**To facilitate informed discussion about environmental enrichment, we have joined the LinkedIn Group called **Laboratory Animal Sciences**.** This group allows members of the laboratory animal science community and our readers to interact over a web-based platform to compare ideas and methods. To participate, you will need to create a LinkedIn account and then join the Laboratory Animal Sciences Group.

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**WIN/WIN FOR ALL**


# THE ENRICHMENT EXTRAVAGANZA MOVES TO ATLANTIC CITY

**The Enrichment Record**

is proud to announce the reorganization of the Enrichment Extravaganza (EE), a full-day event devoted to promoting innovative enrichment strategies for lab animals.

Three years ago, Genny Andrews-Kelly, a laboratory animal technician working for a global pharmaceutical company, envisioned an event that would bring the laboratory animal community together to share ideas and strategies for improving the welfare of animals in a biomedical research environment. With help from a committed group of volunteers, she organized a comprehensive and engaging program she called **The Enrichment Extravaganza**.

Now four years later, it is time to reach a wider audience and give the program the recognition it deserves. Working collaboratively with the New Jersey Association for Biomedical Research (NJABR) and the New Jersey Branch of AALAS, a Planning Committee has expanded the EE, which is scheduled on June 13, the Monday preceding the Tri-Branch Symposium in Atlantic City, NJ. According to Jayne Mackta, publisher of **The Enrichment Record**, "This new venue offers a wonderful opportunity to engage a broader audience and showcase all the exciting advances in the field of environmental enrichment. The change is a win-win for everyone involved."

This all-day event consists of a morning plenary session featuring nationally recognized speakers and eight different one-hour workshops in the afternoon.

**Two Exciting New Features**

This year, organizers have added a poster session and a national award program to identify Enrichment Rising Stars. A call for abstracts has gone out to

encourage the sharing of enrichment experiences through a more formal and recognized process. Several poster authors will be selected to make short presentations during the EE plenary session. All enrichment posters will be included in the larger Poster Session at the Tri-Branch and may be reproduced in future

issues of **The Enrichment Record**. Information regarding EE abstract guidelines and submissions can be found at <http://www.njabr.org/content/abstract-submission>.

In an effort to stimulate research into environmental enrichment and to recognize younger scientists in the field, **The Enrichment Record** has established an Award Program for Enrichment Rising Stars. The call has gone out for exceptional graduate students, who are doing ground-breaking work in this emerging field. Candidates for the **Enrichment Rising Star Award** are graduate students or post-docs who—

- are currently studying or have completed innovative studies on laboratory animal enrichment,
- are highly motivated and enthusiastic
- are willing to present their research to the EE audience.

Requests for submissions have been sent to all major universities and laboratories across the country. Two candidates will be chosen to participate in the Extravaganza. They will present their research and lead workshops. Winners will be presented with a \$500 cash award. Detailed information about the **Enrichment Rising Star Award** can be found at <http://www.njabr.org/content/enrichment-rising-star>.

The Enrichment Extravaganza promises to deliver an enriching experience for all!

For information on EE sponsorship opportunities and registration, including a special package for those attending both the EE and the Tri-Branch Symposium (June 13-15), contact Denise Bianco at [bianco@njabr.org](mailto:bianco@njabr.org).

Article by

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Shoreh Miller, D.V.M., Ph.D., DACLAM  
Robert Wood Johnson Medical School, UMDNJ

# SWINE





# ENRICHMENT

In this review, swine behavior and various methods of enrichment are discussed. The review is based on both published journal articles and anecdotal successful enrichment methods that were shared recently on *CompMed Listserve* ([AALAS.org](http://AALAS.org)).

## ANIMAL MODEL

For the past two decades, swine have been used with increasing frequency in biomedical research as models of human disease, based on notable anatomy and physiology similarities to humans. These studies include cardiovascular research, nutrition, organ transplantation, surgical training and plastic surgery. (Stanton and Mersmann, 1986; Swindle, 1992; Tumbleson, 1986).

## SWINE BEHAVIOR

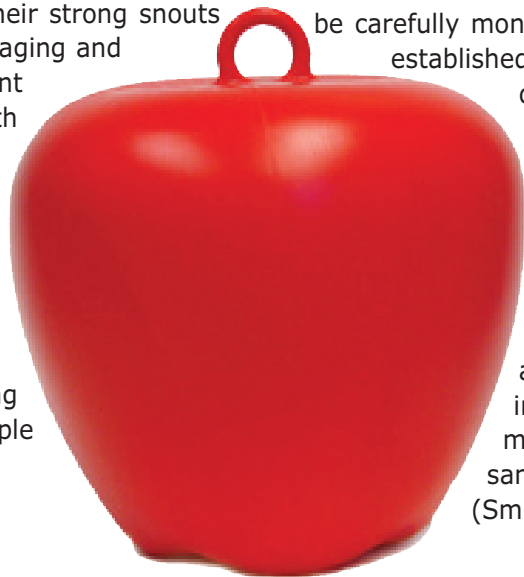
Swine are omnivorous, and use their strong snouts for rooting in the soil. Rooting, foraging and social living are extremely important behaviors. Swine are diurnal, with elevated activity during the evening. In the laboratory, swine activity is related to the presence and activity of humans, rather than the light-dark cycle.

Laboratory swine spend 70-80% of their time lying down or sleeping unless it is feeding time or people enter the room.

Swine are extremely intelligent animals with excellent memories. They can be trained to walk out of their cages and be guided. They are relatively insensitive to noise and are themselves very noisy; however, sudden, extremely loud noises frighten them. Responses to acute stressors are vocalization and attempts to escape. (Swindle et al, 1994, Smith and Swindle 2006).

Swine naturally form close-knit groups and become distressed when separated from other group members, even for short periods of time. Sows and juveniles must be housed in harmonious social groups. Aggression is expressed by butting or biting the neck and ears and quickly subsides in a stable social group.

When unfamiliar swine are housed together, they must be carefully monitored until the dominance hierarchy is established. Incompatible animals will fight and dominant animals may severely injure others in the pen, especially during feeding time. If subordinate individuals are separated from the group, they will be attacked upon reintroduction, whereas a dominant animal can be separated and reintroduced without incident (Bollen et al, 2000). Because adult boars are solitary, individual housing is appropriate. Barrows (castrated males) may be group housed using the same guidelines that are used for females. (Smith and Swindle, 2006).



*continued on page 12*

Toys and food treats used for rooting and foraging, social housing and interactions with humans are among major tools for swine enrichment. In a recent online *CompMed Listserve* survey, 27 responders shared their methods of choice for swine enrichment. A summary of the responses are presented below.

## Toys

Ideal toys must be contaminant-free, durable and cage washer safe. Hanging toys satisfy the need to chew and rub, and items on the floor may be used for rooting. Effective sanitization is essential for all enrichment toys because swine will avoid them if they become soiled. Large durable balls made of impervious materials such as “Big Red Apple” (figures 1 and 2), Jingle balls, and Dumbbells provide opportunity for rooting. Hanging chains with various objects attached across the top of the pen and chewy toys such as Kong toys hanging or on the floor satisfy pigs’ rooting, mouthing and chewing behavior. The hanging toys should be hung low—almost touching the ground—because swine like their heads down in rooting position. Swine also enjoy stainless steel mirrors and rattles. The novelty of toys is key to ensuring a swine’s continued interest; therefore, toys should be rotated regularly. Swine also like to chew flexible objects (figure 3) made of rubber.



Figure 2 Swine enjoying mouthing rooting toy chained to the pen wall.



Figure 3  
Pliable object  
for chewing



Figure 1  
The Big Apple

## Foraging

A substrate such as straw, wood chippings or wood shavings containing commercial foraging pellets, grains or cut fruits will satisfy pigs’ foraging and rooting needs. Also, a durable rubber ball with holes for treat insertions will provoke rooting and foraging (figure 4). Traffic cones with food such as marshmallows or dried fruit hidden at the cone apex are also useful enrichment toys. Cones need to be replaced after 1-2 months.

## Social housing

Social housing with compatible animals is essential for swine. If for scientific, cage size or veterinary reasons, individual housing is necessary, swine should have sensory contacts such as visual, smelling or touching noses through the walls of the pen.

## Auditory

Natural sound, classical and easy listening music can be used for swine enrichment.



## Human Interaction

The influence of humans on swine behavior in a laboratory setting is very significant. Swine that are routinely allowed to approach humans, and rewarded by patting and scratching, will be calmer and less stressed during research procedures. Positive interactions with humans—along with a food treat—can be used for physical examination or drug dosing.

## Movies

Children's movies, including "Babe," may appeal to swine. A television should be placed at swine head height, as swine cannot look up.

## Food treats

Food treats can be used as training rewards or for foraging. Favorite treats include apples, bananas, air popped popcorn, sweet potatoes, carrots, pears, grapes, frozen juice, snow cones (pigcicles) or ice cubes, cookie dough for hiding medication inside (use sparingly), yogurt, crushed rodent or rabbit chow, Timothy Hay Mini Bales and commercially available treats (figure 5).

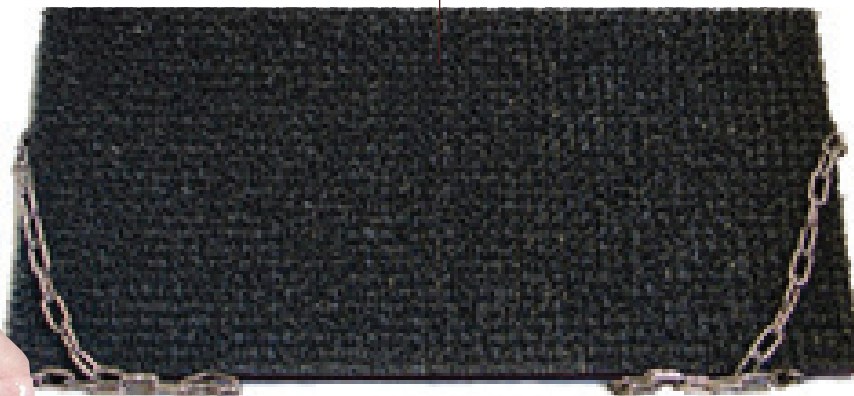


**Figure 5**

Commerically available treats can be used for rewards or foraging

## Scratching

Swine enjoy being scratched either by a scratching board (figure 6) or by humans. The scratching board can be placed to the side of the pen; swine, however, prefer to be scratched by people.



**Figure 6**

Swine scratcher for soothing itchy skin

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## Acknowledgement

The author would like to thank Bio-Serv of Frenchtown, New Jersey for the photographs used in this article.



The Wake Forest University Primate Center (WFUPC), located in Winston-Salem, NC, is a rural campus that comprises housing for nonhuman primates and mice as well as laboratories and offices for investigators and staff—dedicated professionals with long experience in caring for nonhuman primates and other animals in research settings. The mission of WFUPC is to conduct research on diseases of major public health significance, humanely using nonhuman primates and other animal models as patient surrogates.



PHOTOGRAPHY BY KELSEY FINNIE

Faculty members Drs. Allyson J. Bennett and Peter J. Pierre, along with research technician Chris Corcoran, initiated a new outreach and education program several years ago at the WFUPC. The program is an organized effort led by scientists with animal research expertise working together with teams of faculty, staff, and students to effectively reach out locally and more broadly to educate and engage the public with accurate information about WFUPC's animal research programs.

The program's four main domains of activity now include: 1) Meaningful educational interactions, seminars, visits and campus tours with students ranging from elementary through medical and graduate school. 2) Provision of staff training, resources and support to build a broad base of individuals with skills and enthusiasm in public engagement about animal research and diverse careers in the biomedical and behavioral sciences. 3) Student research experiences in animal welfare science, ranging from short-term internships and volunteer opportunities to projects for course credit resulting in student co-authorships and presentations. 4) Active contributions to traditional and social media portrayals of animal research.

PHOTOGRAPHY BY ALISON GRAND



## **Innovative Evaluation & Promotion of Evidence-Based Enrichment Program**

The "Innovative Evaluation and Promotion of Evidence-Based Enrichment" (IEPEE) program is a successful outreach activity aimed at enhancing the environmental enrichment program for nonhuman primates while providing undergraduate students with research opportunities. Students from a number of local colleges and universities have participated in the program. These efforts augment the WFUPC's facility-wide environmental enrichment program



by using scientific approaches to explore new methods, tools, and relationships that provide objective evidence of improvements in animals' well-being.

The IEPEE program works to build research teams that collaborate to design creative new enrichment strategies, collect data on their effectiveness in increasing animals' well-being, and promote the use of those evidence-based strategies and devices. Students participating in this program further their understanding of primate behavior and laboratory animal science. They gain in-depth and hands-on learning experiences with all aspects of research methods and design, and have opportunities to disseminate their findings through research reports and presentations. A recent JAALAS paper (Bennett et al., 2010)\* co-authored by a Salem College student, Leslie Miller, illustrates the approach. The study was the result of an effort to evaluate the feasibility and the cost of providing a major environmental enhancement, wood shavings as a floor cover, for pen-housed monkeys. In this study we were able to clearly demonstrate that use of wood shavings as bedding and foraging substrate for pen-housed monkeys reduces costs and does not result in any adverse effects

for any of the stakeholders or divisions involved in animal care, research, or oversight. Furthermore, ongoing work demonstrates benefits to animal welfare.

As a result of these activities, the IEPEE program promotes effective enrichment for nonhuman primates and scientific training opportunities for students pursuing careers in basic science, human, and animal medicine.

\* Bennett, A.J., Corcoran, C.A., Hardy, V., Miller, L. R., Pierre, P. J. (2010) Multi-Dimensional Cost: Benefit Analysis to Guide Evidence-Based Environmental Enrichment: Providing Bedding and Foraging Substrate to Pen-Housed Monkeys. *Journal of the American Association of Laboratory Animal Science*, 49(5), 571-577.

<http://aalas.publisher.ingentaconnect.com/content/aa-las/jaalas/2010/00000049/00000005>

## **Community Outreach and Education Program**

The Wake Forest University Primate Center's program of outreach and education serves the community by providing children in grades K-12 and their teachers with opportunities to visit the WFUPC and learn about biomedical research. Hundreds of students from a range of schools and number of NC counties have participated in the program.

These campus visits are designed to give visitors educational information about nonhuman primates and the unique role they play in translational research, to highlight the wide range of human health disorders that are addressed by the Translational Science Institute and the WFUPC, and to educate children about careers in science.

For more information, contact Dr. Allyson Bennett, Wake Forest University Primate Center, Director of Community Outreach and Education, at 336-716-1529 or [abennett@wfubmc.edu](mailto:abennett@wfubmc.edu).

WFU Primate Center

Program Director, Dr. Jay Kaplan

Tel: 336-716-1649

E-mail the WFUPC at [wfupc@wfubmc.edu](mailto:wfupc@wfubmc.edu)

<http://www.wfubmc.edu/WFUPC/>

<http://wfubmc.edu/Research/WFUPC/Evidence-Based-Enrichment.htm>

<http://www.wfubmc.edu/Research/WFUPC/Community-Outreach-and-Education-Program.htm>

# An Economical and Enriching Vertical Environment for Nonhuman Primates

A Hammar and T Koban

Huntingdon Life Sciences, East Millstone, NJ

## Introduction

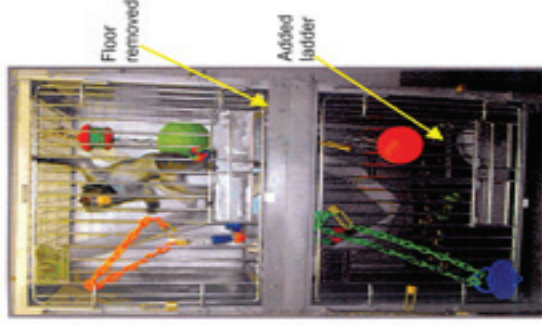
Appropriate housing is one of the most important and effective approaches for provision of an enriching environment for nonhuman primates in a captive setting. Compatible pair or group housing is ideal, as well as an environment that offers ample space, encourages species-typical behavior and enhances psychological well-being. It can be very expensive for research facilities wishing to improve and refine housing and enrichment strategies. For example, nonhuman primate play-cages provide more vertical space and complex physical structures for the animals, but can be very costly to purchase.

## Materials and methods

Huntingdon Life Sciences has developed a cost-efficient play-cage for nonhuman primates by transforming canine caging into nonhuman primate caging. Three standard one-over-one canine racks were modified (i.e. removing floor and bowl holders, adding perches) resulting in what we refer to as our "MX-1, MX-2 and MX-3 Turbo models", which are currently used on a rotating schedule in our nonhuman primate rooms.

### MX-1

Modifications included removing the floor, which separated the bottom from the top of the cage, and replacing it with a platform towards the back of the cage. A PVC ladder was suspended from this platform and connected to the floor. Rubber mats were situated over the floor to create a foraging area on the bottom of the cage. Several toys were placed throughout the cage and a fire hose perch hung from the ceiling. Most of the animals enjoyed spending time in the front of the cage, especially when humans were in the room, but had no perch to sit on in this area.

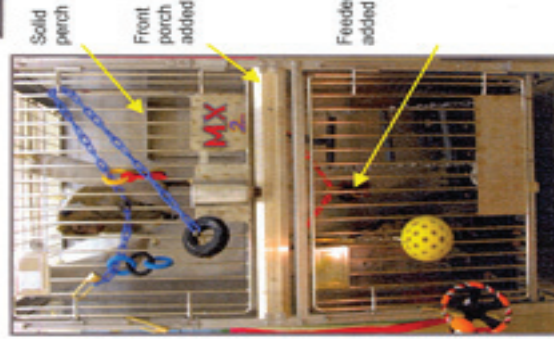


Floor removed

Added ladder

### MX-2

This next version was created with a few new features in mind. A perch was added to the front of the cage where the monkeys enjoyed spending most of their time. We also added a solid metal platform to the upper right corner in the back of the cage. A feeder holder for biscuit presentation was also added.



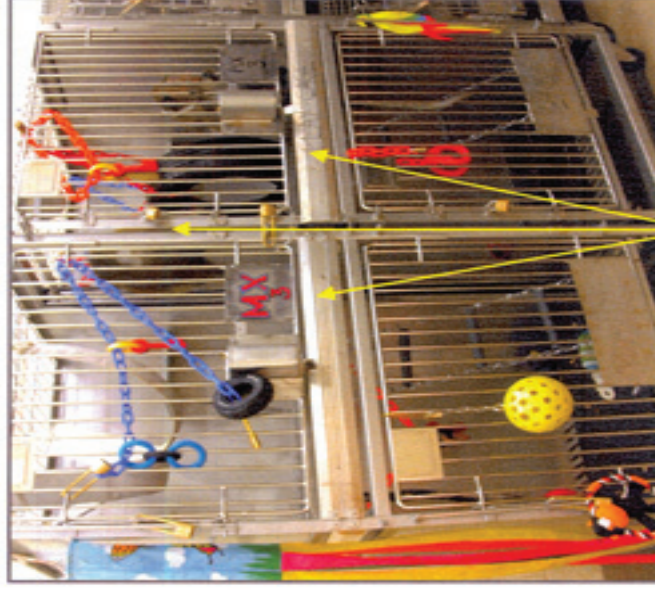
Solid perch

Front perch added

Feeder added

### Results: The MX-3 Turbo

This model incorporates two MX-2 playcages secured together, with enough available space for up to 4 monkeys. The sliding dividers between cages are opened so that the animals can move back and forth with ease. The development of this convertible housing design provides an enriching vertical environment for nonhuman primates, and is also an economically sound option for the research facility.



2 cages connected and dividers opened



## **The Effect of Environmental Enrichment on the Behavior of Captive Tufted Capuchin Monkeys (*Cebus apella*)**

Kirsten R. Jacobsen<sup>1</sup>, L.F. Mikkelsen<sup>2</sup> & J. Hau<sup>1</sup>

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Kirsten R. Jacobsen, D.V.M.

*Lab Animal* • Volume 39 • No. 9 • September 2010  
Pages 269-277, [www.labanimal.com](http://www.labanimal.com)  
doi:10.1038/lab0910-269\*

The authors provided different forms of environmental enrichment to six old laboratory male tufted capuchin monkeys (*Cebus apella*) and studied the behavior of the monkeys during a baseline period and during three enrichment periods. Each observation period lasted 5 d, with an interval of 6 d between periods. During the first enrichment period, the authors provided Buster cubes and wood cylinders with drilled holes filled with gum arabic. During the second enrichment period, monkeys were provided with a deep litter of bark shavings, and during the third enrichment period, they were given Buster cubes, wood cylinders and bark shavings. When provided with enrichment, the monkeys engaged in natural, species-specific activities and began to exhibit behavioral profiles that more closely resembled those of their natural counterparts. This suggests that their psychological well-being had improved and that group housing combined with environmental enrichment can improve the welfare of old laboratory tufted capuchin monkeys that were previously housed individually.

## **Effects of Cage Size and Enrichment on Reproductive Performance and Behavior in C57BL/6Tac Mice**

Julia Whitaker<sup>1</sup>, Sheryl S. Moy<sup>2</sup>, Virginia Godfrey<sup>1</sup>, Judith Nielsen<sup>1</sup>, Dwight Bellinger<sup>1</sup>, & John Bradfield<sup>1</sup>

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  2. Neurodevelopmental Disorders Research Center and Department of Psychiatry, CB 7146, University of North Carolina, Chapel Hill, NC 27599
- Correspondence should be addressed to Julia Whitaker, B.S., M.S., D.V.M.

*Lab Animal* • Volume 38 • No.1 • January 2009  
Pages 24-34, [www.labanimal.com](http://www.labanimal.com)  
doi:10.1038/lab0109-24\*

The authors examined the effects of cage size and enrichment on mouse breeding performance and behavior. Breeding trios of C57BL/6Tac mice were housed in cages of two different sizes

(‘standard’ and ‘large’ cages with 82 in<sup>2</sup> and 124 in<sup>2</sup> floor space, respectively). Half of the cages of each size contained four enrichment items (Nestlet, plastic tunnel, nylon rings and running wheel), whereas the remaining cages had no enrichment. The authors measured the following reproductive parameters: litter size, number of pups that survived to weaning age, average pup weights at 21 d after birth and number of days between births of litters. A subset of weaned male and female pups from each cage size and enrichment condition completed a suite of behavioral tests. Pups raised in large cages weighed less than those raised in standard cages. Enrichment and cage size had certain behavioral effects, which were dependent on gender and behavioral measure. Male pups born in enriched cages showed more anxiety-like behavior and less exploration than did males born in non-enriched cages. Though being raised in enriched or large cages did not clearly improve pups’ performance in behavioral tests, enrichment (regardless of cage size) did significantly benefit reproductive performance; pups from non-enriched cages weighed less than pups from enriched cages, and fewer survived to weaning age.

## **Efficacy of Auditory Enrichment in a Prosimian Primate (*Otolemur garnettii*)**

David B. Hanbury<sup>1</sup>, M. Babette Fontenot<sup>2</sup>, Lauren E. Highfill<sup>3</sup>, Willie Bingham<sup>4</sup>, David Bunch<sup>1</sup> & Sheree L. Watson<sup>1</sup>

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  2. Department of Behavioral Sciences, University of Louisiana at Lafayette, New Iberia Primate Research Center, P.O. Box 13610, New Iberia, LA 70562
  3. Department of Psychology, Eckerd College, 4200 54th Avenue South, St. Petersburg, FL 33711
  4. Mississippi Veterinary Diagnostic Laboratory, Pearl, MS.
- Correspondence should be addressed to  
Sheree L. Watson, Ph.D.

*Lab Animal* • Volume 38 • No. 4 • April 2009  
Pages 122-125, [www.labanimal.com](http://www.labanimal.com)  
doi:10.1038/lab0409-122\*

Research suggests that auditory environmental enrichment might reduce abnormal behavior in certain primate species. The authors evaluated the behavioral effects of exposure to music in a prosimian primate (Garnett’s bushbaby; *Otolemur garnettii*). They exposed bushbabies to a Mozart concerto for 15 min per day for 20 d (5 h exposure total), video-recorded them and subsequently analyzed the frequency of subjects’ grooming and stereotypic behaviors. The authors compared the data with baseline behavioral data that had been recorded over a 20 d period before the experimental treatment. Neither stereotypy nor grooming behavior varied as a result of exposure to music. These results do not support the hypothesis that auditory enrichment in the form of exposure to music is an effective means of reducing stereotypic behavior in *O. garnettii*.

\* <http://www.doi.org>

## There's an old saying that "You can't dance at two weddings at once."

You also can't attend all the meetings and conferences taking place that offer the latest information in the field of laboratory animal science. **Meeting Up** will provide summaries of panels, workshops and symposia covering topics relevant to Environmental Enrichment. If you want more information about any of the presentations described or want to contact the presenters, let us know and we will be happy to connect you: [info@TheEnrichmentRecord.com](mailto:info@TheEnrichmentRecord.com)

### **Innovative Environmental Enrichment Symposium**

*Jennifer Camacho, LVT, LATG*

*Massachusetts General Hospital Symposium Organizer*

*"This symposium was a good mix of cerebral and practical."*—Anonymous feedback

The 4th Annual Innovative Environmental Enrichment Symposium was held on Sunday, October 10, 2010, satellite to National AALAS in the Omni Hotel at CNN Center. This event, hosted exclusively by the Massachusetts General Hospital's Center for Comparative Medicine and led by organizer Jennifer Camacho, seeks to present innovative and advanced concepts of evidence based environmental enrichment and interpret a practical approach towards implementing such designs in a laboratory vivarium.

OLAW Director Dr. Pat Brown presented perspectives on enrichment as they are represented in the new *Guide* revision. This presentation was thought to be extremely helpful and appropriate by symposium attendants; it offered information about continued education specifically regarding the social housing of nonhuman primates through the OLAW web page: [http://grants.nih.gov/grants/olaw/primate\\_enrichment-social\\_housing.htm](http://grants.nih.gov/grants/olaw/primate_enrichment-social_housing.htm)

Dr. Nicolette Petervary, eastern regional animal care specialist for USDA, presented the USDA's Update to interpret the 1985 AWA amendment to include social housing provisions as the standard for housing and care of nonhuman primates, unless there is a scientific justification to house separately.

Dr. John Capitano, a research psychologist from UC Davis, presented an approach towards better science and better management by understanding individual

differences in bio-behavioral organization of nonhuman primates. Dr. Capitano's work describes an objective approach towards evaluating nonhuman primate behavior that aids in the long term captive management of a sophisticated species.

Dr. Tom Donnelly shared an extensive library collection of evidence-based approaches to care and enrichment that support the welfare of laboratory rabbits and rodents. This library offers an international harmonization of information and literature that support experimental animal welfare research.

Dr. Kate Baker from the Tulane National Primate Research Center presented scientific based recommendations for successful pair housing and introduction of adult rhesus macaques in the laboratory setting. This presentation offered evidence that supports the USDA's interpretation to increase the social housing standard. It was thought to be timely and offered highly beneficial information that will answer questions faced by animal care groups.

Melissa Truelove, Socialization Specialist for Yerkes National Primate Research Center, presented a practical interpretation of Dr. Kate Baker's presentation of the scientific findings on how to implement a complex social housing program for over 3400 nonhuman primates. This presentation offered several extensive video examples that were thought to be valuable teaching tools when combined with the documentation resources used by the behavioral staff at Yerkes.

Dr. Jeffery Alberts, professor of psychology from Indiana University, presented concepts of "Mother Love" enrichment and the effects on maternal behavior in rodent growth and sexual development. Feedback concluded that this was an incredibly passionate speaker who covered ideas that are often unconsidered.



Each speaker's presentation was followed by a 10-minute table dialogue to reflect on the material presented and to develop a working plan of action in support of laboratory animal welfare through environmental enrichment. This format was novel to the symposium and was welcomed by attendants whose feedback reflected that the format was helpful and engaging.

Overall, comments from attendants and speakers were enthusiastic and energetic about this symposium's focus on offering continued knowledge on evidence based approaches and methods of interpreting that knowledge into processes that can be effectively managed.

Save the date for future symposia:  
*Sunday, October 9, 2011*  
*Marriott Hotel and Marina, San Diego, CA*  
*(Satellite to National AALAS)*

**Rat Behavior and Enrichment Strategies**

*2010 AALAS National Meeting*  
*Thursday October 14, 2010*  
*Atlanta, GA*

*Dr. Christina Winnicker, Director of Enrichment & Behavioral Medicine for Charles River, Presenter at AALAS Seminar*

Ethologically appropriate enrichment requires an understanding of normal animal behavioral repertoire in order to design an enrichment program that provides real animal benefits. In the research environment, a thorough understanding of the relationship between environment and the physiologic or behavioral system under study is necessary to guide the development of environmental enrichment programs. The behavioral profile and relevant enrichment options for rats, in a talk titled "Rat Behavior and Enrichment Strategies" was presented at the National AALAS meeting in a seminar entitled "Rodent Enrichment- not as simple as you might think".

The talk started with definitions of what environmental enrichment is, and how behavior plays a key role in determining what is truly enriching for this species. The main sensory modalities, normal behavioral repertoire, and resource requirements for rats' natural behaviors were reviewed. Taking this behavior into consideration, aspects of a program for rat enrichment were discussed, including options for social housing, shelters & nesting material, and gnawing devices. Finally, the importance of a behavioral monitoring program to assess the effectiveness of the provided enrichments, including the increase in species-specific desirable behaviors, the decrease of abnormal or undesirable behaviors, and the enhancement of an increase in the animals' ability to cope with research challenges and positively utilize the environment was discussed.

# Reporters Wanted!



In each issue of *The Enrichment Record* we report on Enrichment meetings and conferences in detail. We are seeking volunteers to write summaries of meetings, workshops, and conferences addressing any aspect of environmental enrichment for lab animals. Meeting organizers are welcome to assign a recorder. To request "Guidelines for Meeting Up Summaries," send your name, contact and meeting information to [info@theenrichmentrecord.com](mailto:info@theenrichmentrecord.com)

NAME \_\_\_\_\_  
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Please send your completed form to Annette McCabe  
[mccabe@gr8tt.com](mailto:mccabe@gr8tt.com)  
 We hope to hear from you soon. Jayne Mackta, *Publisher*  
 732-869-9449

## Meeting Announcement submission Form

Please submit the following information to  
 Rhoda Weiner, Editor [rmbw19@verizon.net](mailto:rmbw19@verizon.net)

ORGANIZATION \_\_\_\_\_  
 CONTACT NAME \_\_\_\_\_  
 PHONE \_\_\_\_\_  
 EMAIL \_\_\_\_\_  
 DATE OF EVENT \_\_\_\_\_  
 TIME OF EVENT \_\_\_\_\_  
 EVENT LOCATION \_\_\_\_\_  
 TYPE OF EVENT \_\_\_\_\_  
 Conference \_\_\_\_\_ Workshop \_\_\_\_\_ Lecture \_\_\_\_\_  
 Meeting with featured speaker \_\_\_\_\_  
 BRIEF DESCRIPTION OF THE EVENT \_\_\_\_\_  
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# Upcoming Meetings

## Environmental Enrichment for Laboratory Animals—All Animals Big and Small March 14, 2011

**Boston, MA**

Free for MSMR members.

Modest fee for non-members.

Details and registration on-line late January, 2011.

<http://www.msmr.org/workshops.html>



## Animal Behavior Management Alliance Annual Conference “Miles Above...and Beyond!”

**April 17-22, 2011**

**Denver, CO**

*Elevate Behavior Management in the Mile High City!*

The 11th Annual ABMA

Conference will kick off with keynote speaker, Dr. Jill Mellen from Disney's Animal Kingdom, and will culminate with an Earth Day to remember at Denver Zoo. All of the conference favorites


will be included, plus a few new ideas! For information on attending and presenting, please visit the ABMA website

[www.theabma.org](http://www.theabma.org)

- **Hosts:** Denver Zoo, Cheyenne Mountain Zoo and Downtown Aquarium, Denver
- **Hotel:** The JW Marriott, Cherry Creek
- **Site visits to:** Cheyenne Mountain Zoo, Downtown Aquarium, Denver Zoo
- Pre-conference trip to watch a rescue demonstration by avalanche deployment unit dogs
- CEU credits for CPDT and

IAABC certification!

- Possible pre-conference TAG teach opportunity
- Travel scholarship, see website for details



**SAVE THE DATE**  
*Monday, June 13, 2011*

### *Enrichment Extravaganza*

*New Venue - New Sponsors*

Atlantic City Convention Center  
Atlantic City, NJ

Inspiration • Innovation • Strategies That Work  
Poster Presentations • Workshops • Vendors

**Organizers**  
American Association for Laboratory Animal Science - NJ Branch  
New Jersey Association for Biomedical Research  
*The Enrichment Record*

**For more information contact:**  
Denise Bianco at 908.228.2203  
or email: [bianco@njabr.org](mailto:bianco@njabr.org)

## The Enrichment Extravaganza (EE)

*Co-sponsored by The Enrichment Record, NJABR & NJAALAS*

**June 13, 2011 • 9 AM—4 PM**  
**Atlantic City Convention Center**  
**Atlantic City, NJ**

To register for the EE, go to: <http://www.njabr.org/content/extravaganza-registration>. For Special Registration Package for EE and Tri-Branch Symposium, go to [www.tribranch.org](http://www.tribranch.org)

## The 45th Annual Congress of the International Society for Ethology (ISAE)

**July 31-August 4, 2011**  
**Hyatt Regency,**  
**Indianapolis, IN**

ISAE is the academic society for scientists working in the field of applied animal behavior and welfare. One of the major themes

for 2011 is scientific evaluation of laboratory animal behavior, welfare and enrichment. Further details of the conference are available at: <http://www.ars.usda.gov/meetings/ISAE2011>

The congress has been certified for 16 CEUs by various professional bodies.

## THE SHAPE OF ENRICHMENT 10th International Conference on Environmental Enrichment (ICEE)

**August 13-20, 2011**  
**Portland, Oregon**

For the first time, this conference will be hosted by a biomedical research organization, The Oregon National Primate Research Center. The Oregon Zoo is also hosting the conference.

[http://www.enrichment.org/miniwebfile.php?Region=International&File=new\\_meetings.html&File2=index\\_sb.html&NotFlag=1](http://www.enrichment.org/miniwebfile.php?Region=International&File=new_meetings.html&File2=index_sb.html&NotFlag=1)

Conference host can be contacted at [10ICEE@enrichment.org](mailto:10ICEE@enrichment.org).

## Annual Innovative Environmental Enrichment Symposium

**October 9, 2011**

**San Diego, CA**

**Marriott Hotel and Marina**

**(Satellite to National AALAS)**

The Massachusetts General Hospital, Center for Comparative Medicine hosts an annual Innovative Environmental Enrichment Symposium. This event is for individuals in the field of animal behavior, enrichment and welfare who are passionate about providing quality laboratory standards that exceed regulations and meet animal welfare needs.

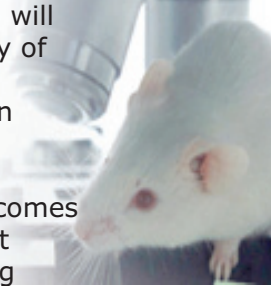
The objective of this symposium is to provide a forum at which participants can compare notes



on innovative animal enrichment and conditioning programs and how to best determine the effectiveness of those versus current practices.

The symposium will include a variety of highlights:

- Developing an enrichment program
- Negative outcomes of Enrichment
- Social housing



- Behavioral conditioning
- Human-animal interaction and socialization
- Enrichment in a GLP environment
- Determining economic costs and benefits of enrichment strategies
- Regulatory considerations in enrichment programs

[http://www.virtualvivarium.com/about%2Dus/upcoming-events/environmental\\_Enrichment\\_Symposium.asp](http://www.virtualvivarium.com/about%2Dus/upcoming-events/environmental_Enrichment_Symposium.asp)

Please send notification of your Upcoming Meetings to [rmbw19@verizon.net](mailto:rmbw19@verizon.net)

# THE Enrichment RECORD

**The Enrichment Record** is a quarterly E-Zine created by the Laboratory Animal Research Community as an online forum for:

- Discussing environmental enrichment in the optimal care of laboratory animals
- Documenting best practices
- Sharing data on the impact of environmental enrichment on the science
- Building the case for integrating enrichment into research design

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