

## Toxicology at Iowa State University Fall 2011



### Toxicology Retreat 2011—“Golden”

The Toxicology program held a retreat, TRANSACTIONS OF THE TOXICOLOGY PROGRAM, on Friday, October 21, 2011 at McFarland Park, just north of Ames. Faculty held a meeting at 12:30 to discuss changes to the program (more on this later in the newsletter). Beginning at 2:00 p.m., two invited speakers presented their research. Oksana Lockridge, Ph.D., Professor, the Eppley Institute, Department of Biochemistry, University of Nebraska Medical Center, presented, “Aerotoxic Syndrome in Jet Airplane Travelers”. **Andrean (Ann) L. Simons-Burnett**, Ph.D., Assistant Professor, Department of Pathology and Human Toxicology Program, The University of Iowa (Ann is an alumna of Iowa State receiving a BS in Biochemistry and a Ph.D. in Toxicology with **Pat Murphy** and **Suzanne Hendrich**, Food Science and Human Nutrition) presented “The role of NOX4 in EGFR-based Chemotherapy.” Ann also spoke briefly about her journey from Iowa State Ph.D. student to Assistant Professor, University of Iowa. Ann wanted her friends to know she is still a Cyclone!

This year the program purchased gold polo shirts with “Iowa State University, Toxicology Graduate Program” embroidered on the shirts. We hope you will find it easier to recognize them at national meetings—they certainly brightened up our retreat.

Following the program, participants enjoyed an evening meal of either steak or chicken with baked potato, fruit, and vegetables.

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**RE: Questions about American Board of Toxicology Certification**

**Dear Alumni:**

The Toxicology faculty recently discussed how our program might help prepare our students, alumni and others for certification through the American Board of Toxicology (DABT)

[http://www.abtox.org/ABOT\\_about.shtml](http://www.abtox.org/ABOT_about.shtml) .

**Question:** Would you let us know if you are ABT certified—email [toxmajor@iastate.edu](mailto:toxmajor@iastate.edu) We want to ask you what helped you the most to prepare for certification and if believe that certification has been valuable to you in your profession and for obtaining employment in toxicology-based jobs.

**Question:** Would you let us know if you are a member of the Board of Directors for ABT?

**Question:** Would it be helpful to alumni for TOX to offer a course, on-line, that would help you prepare for the ABT examination.

**Question:** Would it be helpful to alumni for TOX to offer a course, on-line, that would support the recertification?

### **Fall Toxicology Graduates (graduating all the “A’s” from our roster)**

**Hilary Afeseh Ngwa** ([Anumantha Kanthasamy](#), Biomedical Sciences) Ph.D. “Neurotoxic Effect of Vanadium and Manganese on Nigrostriatal and Olfactory Dopaminergic Systems: Potential Role in the Etiopathogenesis of Parkinson’s Disease.” Hilary has accepted a position in industry, product safety, in Brussels.

**Arunkumar Asaithambi** ([Anumantha Kanthassamy](#), Biomedical Sciences) Ph.D. “Compensatory mechanisms of neuroprotection by PKD signaling against oxidative damage in experimental models of Parkinson’s disease.”

**Vurtice (Vic) Albright** ([Joel Coats](#), Entomology) M.S. “Investigations into the capabilities of switchgrass to phytoremediate atrazine contamination in surface water runoff”. Vic will continue on for a Ph.D. with Dr. Coats.

## Recent Student Publications

**Afeseh Ngwa Hilary**; Kanthasamy Arthi; Yan Gu; Ning Fang; Anantharam Vellareddy; Kanthasamy Anumantha G. Manganese nanoparticle activates mitochondrial dependent apoptotic signaling and autophagy in dopaminergic neuronal cells. *Toxicology and Applied Pharmacology*. 256:227-40.

**Arunkumar Asaithambi**, Arthi Kansasamy, Hariharan Saminathan, Vellareddy Anantharam and Anumantha G. Kanthasamy (2011), Protein Kinase D1 (PKD1) activation mediates a compensatory protective response during early stages of oxidative stress-induced neuronal degeneration. *Molecular Neurodegeneration* 2011, 6:43-54.

Hariharan Saminathan, **Arunkumar Asaithambi**, Arthi Kanthasamy, Vellareddy Anantharam and Anumantha G. Kanthasamy (2011), Environmental neurotoxic pesticide dieldrin activates a non receptor tyrosine kinase to promote pkc $\delta$ -mediated dopaminergic apoptosis in a dopaminergic neuronal cell model. *Neurotoxicology*, 32(5):567-77.

**S. K. Buxton**, C Neveu, C L Charvet, A P Robertson, R J Martin (2011). On the mode of action of emodepside: Effects on membrane potential and voltage-activated currents in *Ascaris suum*. *British Journal of Pharmacology*, 164: 453-470.

R. J. Martin, **S. K. Buxton**, C. Neveu, C. L. Charvet, A. P. Robertson (2011). Emodepside and SLO-1 potassium channels: A review. *Experimental Parasitology*. In Press.

Gordon, R., **Hogan, CE**, et. al. (2011) A Simple magnetic separation method for high-yield isolation of mouse primary microglia. *J. Neurosci Methods*. Jan 15; 194(2):287-96. Epub 2010 Nov. 11. {Kanthasamy Lab, Biomedical Sciences}

**Mani, V.** et al. Endotoxin, inflammation and intestinal function. *Journal of Animal Science*. Under review. {Gabler Lab, Animal Science}

**Delgado JE**, Wolt JD. 2011. Fumonisin B1 toxicity in grower-finisher pigs: A comparative analysis of genetically engineered Bt corn and non-Bt corn by using quantitative dietary exposure assessment modeling. *Int J Environ Res Public Health* 8:3179-3190; doi:10.3390/ijerph8083179.

**Delgado JE**, Wolt JD. 2010. Fumonisin B<sub>1</sub> and implications in nursery swine productivity: a quantitative exposure assessment. *J Anim Sci* 88:3767-3777.

## Advance to Ph.D. Candidacy

**Erin Bilsten** (Gary Munkvold Lab, Plant Pathology).

**Esther Haugabrooks** (Suzanne Hendrich Lab, Food Science)

**Ashish Sachan** (Marit Nilsen-Hamilton Lab, Biophysics Biochemistry and Molecular Biology)

**James Delgado** (Jeff Wolt Lab, Agronomy)



## UPWARD BOUND STUDENT LAB ACTIVITIES PROVIDED BY TGSO

On Saturday October 29<sup>th</sup> 2001 the Toxicology Graduate Student Organization (TGSO) participated in the campus wide event known as Science Bound. The Science Bound program is Iowa State University's premier pre-college program to increase the number of ethnically diverse Iowa students who pursue ASTEM (agricultural, scientific, technical, engineering and mathematics) degrees. The program draws students with potential from middle and high schools in Des Moines, Denison and Marshalltown, Iowa.

The event took place in Bessy Hall and was organized by **James Delgado** (TGSO president, **Wolt** Lab, Agronomy). All Science Bound students were high school sophomores. Dissections were performed on squid, earthworms, trout and crawfish. After the experiments, Science Bound students had the opportunity to ask TGSO students questions about their academic experience and about the toxicology program. TGSO students who participated in the event were **Christi Schulte** (**Rowling** lab, FSHN), **Colleen Hogan-Jeffrey** (**Anumantha Kanthasamy** Lab/Biomedical Sciences) and **Arun Asaithambi** (**Anumantha Kanthasamy** Lab/Biomedical Sciences). Special thanks is extended to Linda Westgate (Biology Coordinator), who allowed the use of the Bessey Hall Lab. (Submitted by James Delgado)

## CHANGES TO THE TOXICOLOGY PROGRAM

The Toxicology Supervisory Committee reviewed several program and course policies and procedures this fall and these changes were voted on favorably by the Toxicology faculty and will be implemented.

√ A change was made to the required 8 credits in Biochemistry for Ph.D. students. The new policy is BBMB 404, BBMB 405, and 2 additional credits from 500 or 600 level BBMB courses.

√ All Toxicology majors will be required to sign up for Current Topics in Toxicology, TOX 689X, every semester. TOX 689X, Current Topics in Toxicology (R credit) will build community and advance individual and group understanding of diverse areas of toxicology research. Development of critique, discussion, interactions with other toxicological researchers. Includes a written component.

√ The program has established recommended completion dates for its majors for committee formation (by end of first year in program), POS completion (by end of first year in the lab), and taking the Prelim (by end of the third year in the program).

√ The program will require that all TOX majors complete a scientific ethics course that meets NIH or NSF requirements. Present courses include Vet Path 554 and GR ST 565.

√ The program will require all Toxicology minors to take one semester of Current Topics in Toxicology, Tox 689X.



## TOX SHORTS!

**Jo Anne Powell-Coffman**, Genetics Development and Cell Biology, and former genetics graduate student, Hongtao Qin, Ph.D., wrote a chapter for The AH Receptor in Biology and Toxicology entitled “Invertebrate AHR homologs: Ancestral functions in sensory systems.”

The **Kanthasamy** Labs received two NIH R01 grants for neurotoxicology related projects, published over 10 papers, and received a patent application. Dr. Kanthasamy was awarded the John Doull Toxicology Award at Central States SOT. NIH NIEHS RO1 Mechanisms of Manganese Neurotoxicity Principal Investigator: **Anumantha Kanthasamy**, Ph.D. CO-PI, **Arthi Kanthasamy** The objective of this project is to compare the apoptotic cell death mechanisms in striatopallidal neurons and nigral dopaminergic neurons following chronic exposure to manganese in cell culture and animal models. NIH-NINDS, RO1 Grant, PI: **A.G. Kanthasamy**, CO-PI, **Arthi Kanthasamy**, ‘Oxidative Stress Induced Compensatory Protective Mechanisms in Parkinson’s Disease.’ Dr. Kanthasamy was appointed as Chair of Biomedical Sciences.

**Suzanne Hendrich**’s lab recently received funding from the US Wheat Barley Scab Initiative (scab is a *Fusarium* fungal disease) to study the human gut metabolism of deoxynivalenol (DON) glucoside. A form of this fungal toxin produced in some wheat varieties shows lower DON concentrations.

**Boris Jovanovic** who completed his Ph.D. this summer in the **Dusan Palic** lab, Biomedical Sciences, received a 2011 Teaching Excellence Award and a 2011 Research Excellence Award.

**Joel Coats**’ lab (Entomology) has begun testing natural insecticides and natural repellents against bed bugs, the latest scourge of humanity, to address their resurgence everywhere.

**Joel Coats**, Entomology, was promoted to Distinguished Professor and gave an invited presentation on Green Chemistry for Insect Repellents at an international conference on mosquito control in Beijing, China. Joel also presented a talk on “veterinary antibiotics in the aquatic environment” to the American Chemical Society National Meeting in Denver.

**Dan Chen (Manju Reddy Lab/FSHN)** presented “EGCG protects against 6-OHDA induced neurotoxicity in cell culture mode” and was selected for a travel fellowship by the 14<sup>th</sup> Trace Elements in Man and Animals (TEMA-14) meeting in Enshi, Hubei, China.

**Somchai Rice (Jacek Koziel Lab/Agricultural Biosystems and Engineering)** was inducted into the Alpha Epsilon Honor Society for ABE.

**Zhiyi Qiang (Hendrich Lab/FSHN)** earned an ISU Research Excellence award and is now a post doc at NIH.

**Aileen Keating**, Animal Science, received an R00 grant from NIEHS to study the involvement of Glutathione S-transferase (GST) proteins in ovarian protection from chemicals that deplete the follicle pool (May 2010 – May 2013).

**Charlie Miller**, DVM, Ph.D., Elanco R&D, graduated a “few” years ago but continues to publish papers related to his Ph.D. His major professor was Gary Osweiler, Veterinary Diagnostic and Production Animal Medicine.

**Miller, C.D.**, Richard J.L. and Osweiler G.D. Cyclopiazonic acid toxicosis in young turkeys; clinical, physiological and serological observations. *Toxin Reviews*, 30 (2-3) 42-46, 2011.

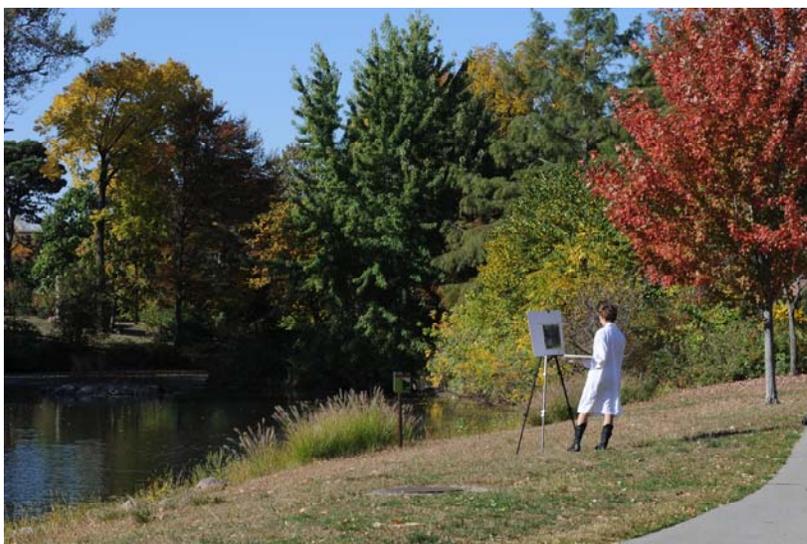
**Miller, C.D.** Osweiler G.D. and Richard J.L. Ultrastructural and functional changes of turkey

myocardium induced by *in vitro* exposure to cyclopiazonic acid. *Toxin Reviews*, 30 (2-3) 47-51, 2011.

**Miller, C.D.**, Osweiler G.D., Richard J.L. and Meador V.P. Morphological and hematological changes in young turkey poultlets acutely exposed to cyclopiazonic acid. *Toxin Reviews*, 30 (2-3) 52-58, 2011.



**Richard Martin**, Chair of Toxicology and members of the TOX Supervisory Committee: **Aileen Keating**, Animal Science; **Arthi Kanthasamy**, Biomedical Sciences, and **Joel Coats**, Entomology. Not pictured **Anumantha Kanthasamy**, Biomedical Sciences, and **Dulsan Palic**, Biomedical Sciences.



**Lake Laverne, ISU campus.**

# FOR DVM'S

- Residency/PhD program in veterinary toxicology
- PhD without residency in veterinary toxicology

The program will provide interested veterinarians with a solid, broad base training in toxicology through diagnostic casework, course work, seminars, and research. The goal of the program is to produce well-trained, board eligible toxicologists (American Board of Veterinary Toxicology and American Board of Toxicology) who are market ready in a variety of capacities to ensure human, animal and environmental health. Successful graduates can pursue careers in academia, industry or government.

- The residency program is designed to be completed within 3 years. Opportunity to concurrently pursue a PhD degree is negotiable. Completion of the PhD degree (straight path) is likely to require a minimum of 4 years.
- Qualified applicants will have a DVM or equivalent degree in veterinary medicine, demonstrate a desire for a career in veterinary toxicology and have excellent communication skills.
- A minimum of 1 year of practice or research experience is desirable. Areas of active research in the department include various topics in applied veterinary toxicology in livestock and investigations into the role of the environment in the pathogenesis of Parkinson's disease.

DVMs interested in the combined residency/PhD program in veterinary toxicology should submit (1) a letter of intent stating interests and career goals, (2) a curriculum vitae, (3) transcripts from veterinary schools, and (4) three letters of recommendation to: Ms. Courtney Witte, Department of Veterinary Diagnostic and Production Animal Medicine 2203 Lloyd Vet Med Center, Ames, Iowa 50011-1250 or by e-mail at [cwitte@iastate.edu](mailto:cwitte@iastate.edu).

DVMs interested in the straight path to a PhD program may apply either through the toxicology program <http://www.gradcollege.iastate.edu/academics/programs/apresults.php?apnumber=150> or through the neuroscience program <http://www.neuroscience.iastate.edu/application>.

Please contact Dr. Wilson Rumbeiha, Department of Veterinary Diagnostic and Production Animal Medicine (VDPAM) (515-294-1950 or [rumbeiha@iastate.edu](mailto:rumbeiha@iastate.edu)) with questions about the position and program.

**The position will remain open until filled.**

Iowa State University is an affirmative action/equal opportunity employer.