Arkansas State University
Environmental Sciences Program
Summer 2004

EVS NEWS

Understanding, Protection, Management & Use

Arkansas State University Environmental Sciences Program

Summer 2004

We've been…

Recruiting
Moving, welcoming, and settling
Researching
Conferencing
Publishing
Defending
Hooding
Celebrating

INSIDE THIS ISSUE:

EVS—Summer 2004	1
Director's Message	1
New Students	2
Ongoing Students	2
Congratulations	3
New & Old Faculty	4
Featured Instructor	5
R.I.S.E.	5
Recently Published	6
Accomplishments	7
Presentations	7
Featured Laboratory	8

DIRECTOR'S MESSAGE

JERRY FARRIS

While summer offered vacations for a few, I observed others so intensely linked to their research and program objectives that little time was left for much of a "get away" this year. If you were one of those dedicated souls, then I hope the time has paid off in some of the ways listed in this edition of EVS News. Take pride in knowing that those accomplishments clearly benefit all of us within the program, and promote the learning environment on our campus. A special thanks is due to each of you contributing to our website and newsletter which furnish improved internal communication of our accomplishments, opportunities, and plans.

Those plans and our program growth are critical to the university addressing the changing nature of higher education and how graduate education fits into the university's strategic action plan. Our growing multidisciplinary program sometimes offers advantages to fitting a unit-specific involvement in those plans and assessing our approach. That we've been constantly challenged to change creates a bit of nervousness. We sometimes overlook all that may be required to successfully attract and address students. There's more to making that "intent to graduate" card pay off than mere supplies, facilities, stipends, classes and such. Those items have actually continued to improve during this summer. Solid aspects of our program should mostly seem reasonable in what we ask of the system and ourselves. It seems this "tuning" should include the varied ways in which we communicate accomplishment, plans, and opportunities. It is with this intent of continual tuning that our program has grown not only by numbers, but also in substance. That substance is most evident in the individual exchanges that I observe between students, faculty, researchers, and the public. Enjoy the information which conveys the seasonal substance of our program that has left a paucity of sand in my sandals, but a few beach appropriate tunes in my head, none the less, about how we are becoming better at what we do.

"I'm pickin' up …..good vibrations" as well, "changes in latitude, changes in attitude, nothing remains quite the same".

New Students

We want to welcome our new doctoral students that began arriving this summer for the fall semester: **Thomas J. Benson**, MS – Biology from Iowa State University working with Jim Bednarz; **Melissa Bliss**, BS – Education from Southeast Missouri State University; **Leonette Cox**, BS – Chemistry from Morgan State University working with Robyn Hannigan; **Lisa Gilbreath**, MS – Chemistry from Arkansas State University working with Jerry Farris; **Mathangi Gopalan**, MS – Ecology from Pondicherry Central University working with Tom Risch;

Yanyan Lu, MS – Environmental Engineering and Statistics from Michigan Technological University working with Kimberly Mace; **Alejandra Ratti**, BS – Biotechnology from University of Buenos Aires working with Hector Flores; and **Jason Self**, BS – Biology from Lyon College working with Robert Engelken.

Ongoing Students

Progress counted as research, publishing and presenting

Azah Abanda continued his research on trace elements in black shales, analyzed data and wrote a chapter of his dissertation. In June he attended the 11th International Symposium on Water Rock Interaction in Saratoga Springs, NY and presented his research entitled: *Laboratory study of chemical weathering of middle ordovician black shales.*

Ken Levenstein, just completed his fourth and final summer of dissertation research in the Galápagos Islands where he has studied the behavioral ecology of the Galápagos Hawk. Each year, Ken has collected and analyzed data on the reproductive success and prey densities on territories of different size groups. He will present his latest findings at the Raptor Research Foundation's annual meeting this November in California.

Sam McCord spent the summer identifying invertebrates from a Best Management Practice study, completing them just about the time classes began. He found time to tag along on a few field trips with Dr. Harp (stalking Tennessee dragonflies), Ben Wheeler and Waylon Hiler (diving for hellbenders) and Andy Peck (slipping on rocks and chasing bugs), to keep the moss from growing under his feet.

Heidi McIntyre began her dissertation research with the endangered freshwater mussel *Potamilus capax* . Additionally, she participated in several on-going projects including the L'Anguille/St. Francis Watershed project. She is currently in Phase I of the *P. capax* project to determine mussel condition before and after relocation.

Katie McKeon made progress on her Ph.D research studying mid-latency evoked auditory potentials of male rats and the effects of environmental tobacco smoke and is now moving to another phase of the research.

George Ogendi presented some of his research on chemical weathering of black shales and its ecological impacts on stream water and sediment quality at the 11th International Symposium on Water Rock Interaction (June 27th – July 2nd, 2004) at Saratoga Springs, New York. He also presented at the Mid-South SETAC meeting at the University of Mississippi with Drs. Farris and Hannigan and Ms. Smith as co-authors.

On June 15, **Abou Sako** defended his dissertation proposal and since then has been busy interpreting sediment and water geochemistry data from Lake Tanganyika. He has submitted an abstract to the annual meeting of the Geological Society of America, for a November conference in Denver entitled: *Sediment-borne major and trace element geochemistry of three tributaries of Lake Tanganyika, East Africa.*

Joy Trauth presented a poster at the National Meeting of Ichthyologists and Herpetologists in Norman, OK. Her busy summer included a Ph.D proposal defense, passing her second qualifying exam in Genetics, and receiving her MA in Biology in August.

Ben Wheeler was busy this summer along with other co-investigators in writing and receiving grants: 1) $42,500 grant to construct a database of all herpetological museum voucher specimens from Arkansas that are housed within the United States, 2) $85,000 grant to inventory and determine the relative abundance of crayfish, mussels, and salamanders in the Spring River, and 3) a $5,000 grant from U.S.F.W.S. to conduct Ozark hellbender habitat assessments in the upper Eleven Point River.

ASU ARKANSAS STATE UNIVERSITY

Congratulations: Dr. Anil Baral

Anil Baral was awarded his Ph.D. in Environmental Sciences in August, 2004 after completing work with Dr. Robert Engelken on the development of aqueous chromium (III) electrolytes for electroplating chromium films. His research project was entitled, *Environmental Sustainability in Chromium Electroplating Industries in the USA: Study of the Processes, Environmental Impacts, and Policy.* Anil received his BS and MS degrees from the Tribhuvan University in Nepal and his MS from the Asian Institute of Technology in Bangkok.

He and Dr. Engelken recently submitted two manuscripts from his doctoral research. Dr. Baral recently presented an aspect of his research to the Institute of Hazardous Materials Management at their conference in Las Vegas in July as the culmination of his previous one-year graduate research fellowship funded by the organization. He is now teaching as a temporary instructor at ASU-Paragould as he applies for academic positions in environmental management.

Drs. Robert Engelken & Anil Baral

Congratulations: Dr. William W. Stephens

William W. Stephens successfully defended his dissertation in June of 2004 and was awarded his Ph.D in Environmental Sciences in August. He received his BS degree in 1976 from the University of Central Arkansas and his MS from Arkansas State University in 1979.

He has been involved with the commercial catfish and baitfish industry. He became concerned about the sustainability of the industry and possible contributions to basin contaminant loading affecting aquatic receiving communities.

Under the guidance of Jerry Farris, the director of the Environmental Sciences Program at Arkansas State University, William's dissertation research, *Characterization and Impact Assessment of Aquaculture Effluents on Wadeable Drainages in the Deltas of the Lower Mississippi River Valley,* provided a valuable perspective for commercial aquaculture's effluent effects. Utilizing laboratory biomonitoring and instream community assessment techniques he measured the potential risk associated with discharges from aquaculture.

William is currently a postdoc at Arkansas State University and is scheduled to conduct an ecological risk assessment of the Judd Hill Plantation while pursuing a career in environmental consulting .

Drs. Jerry Farris & William Stephens

Summer commencement included two Ph.D's from the Environmental Sciences Program

NEW FACULTY

"Welcome Drs. Al Christian, Carolyn Dowling, Kimberly Mace and Tanya McKay"

Four new faculty came on board this summer: Drs. Al Christian, Carolyn Dowling, Kimberly Mace, and Tanya McKay.

While **Al Christian** is not a new face, he is a new faculty member in the Department of Biology. Al received his Ph.D in Zoology from Miami University in Oxford, Ohio in 2002 where he studied the spatial and temporal analysis of freshwater mussel assemblage sizes, structure, distribution, trophic status, and nutrient recycling in low-order streams. Al was a postdoctoral researcher in the EVS program before taking a temporary instructor position from 2002-2003. Currently Al's interest remains with aquatic ecology, food webs, nutrient recycling of aquatic organisms and the life history and ecology of freshwater mussels.

Carolyn Dowling is a new assistant professor in the Department of Chemistry and Physics. She was awarded her Ph.D from the University of Rochester (Rochester, NY) in 2002 where her research focused on coastal groundwater hydrology, specifically on the quality and availability of fresh groundwater resources for coastal communities and groundwater discharge to coastal oceans. Prior to her current position, she was a postdoctoral researcher with Dr. W. Berry Lyons at the Byrd Polar Research Center at Ohio State University. She is organizing her classes and developing a research program in Environmental Chemistry. Her typical research projects focus on water-rock interactions and groundwater geochemistry. She is currently exploring the possibility of studying the environmental fate of roxarsone in poultry litter of the Ozark Highlands, Arkansas.

Kimberly Mace recently joined the faculty of Chemistry and Physics and the Environmental Sciences Program. She came to ASU after completing a postdoctoral position from the National Center for Atmospheric Research in Boulder, Colorado from 2002-2004. There she worked on water-soluble organic compounds in atmospheric aerosols as part of her postdoctoral work. Dr. Mace obtained her Ph.D from Texas A&M University, her undergraduate degree is from North Carolina State University, and she is originally from Mebane, North Carolina (about 30 minutes west of Durham-Chapel Hill). She plans to pursue additional research aimed at examining organics within atmospheric aerosols and rainwater from sites around the world. She is preparing to teach Biogeochemistry in the spring semester.

Tanya McKay received her Ph.D in Entomology from Kansas State University in December 2002. Her research examined the behavior of a parasitic wasp that also attacks house flies as biological control agents to reduce filth fly populations. From 2002-2004 she held a postdoctorate position in Veterinary Entomology at the University of Arkansas. Tanya is teaching two classes which include General Entomology and Insect Taxonomy and will continue her research in Med Vet Entomology. She is currently recruiting undergraduate and graduate students to her program and would like to hear from those interested .

OLD FACULTY: NEW FEATURES

Dr. David Gilmore, Assistant Professor of Environmental Biology, received his BS in Biochemistry from the University of Maine, his MA in Microbiology from Indiana University, and his Ph.D in Microbiology from the University of Connecticut. Dave directs the Environmental Microbiology Laboratory at ASU and researches microbial physiology and its relationship to environmental issues. He has worked with the production and degradation of bacterial polymers, especially plastics, the degradation of certain pollutants and utilization of nutrients such as sulfonates by various bacteria, and the degradation of a detergent by plastic-producing bacteria. This research included plastic synthesis as well as the mechanism of breakdown of detergent. His most recent doctoral student, Dr. Kwang-Min Lee has relocated to the University of South Korea in Seoul.

Dr. Robert Engelken, Director and Professor of Electrical, Computer, and Information Engineering received his BS in Physics from Arkansas State University, his MS in Electrical Engineering from the University of Missouri - Rolla, and his Ph.D in Electrical Engineering from the University of Missouri – Rolla. Robert has been affiliated with ASU since 1982 and the EVS Program since its inception. His research group has become active in the field of low toxicity and low environmental impact materials and associated synthesis/deposition, processing, characterization, and applications. Dr. Engelken directs the Optoelectronic Materials Research Laboratory, which typically also involves three to six student research assistants. His most recent doctoral student, Dr. Anil Baral worked with the development of aqueous chromium (III) electrolytes for electroplating chromium films that are much safer and more environmentally friendly than with Cr (VI).

ASU
ARKANSAS STATE UNIVERSITY

FEATURED INSTRUCTORS—

William H. Baker, Associate Professor of Plant Sciences in the College of Agriculture received his BS in Environmental Science from the University of Arkansas in 1981, his MS in soil chemistry in 1983 from the University of Arkansas, and his Ph.D in 1987 from Texas A&M University in College Station, Texas.

His direction of the Precision Ag Laboratory relies heavily on geographic information software (GIS) (ArcView 9) and image processing software (Erdas Imagine). Remote sensing information from aerial and satellite imagery plays a significant role in the technologies used by his laboratory. Much of the information collected and evaluated comes from sensors on the agricultural equipment or aerial imagery. Other tools include field GPS units, soil electrical conductance (Veris), and a spectroradiometer. His laboratory houses five masters and two undergraduate students. Projects range from mapping rice diseases and finding means to direct and reduce pesticide inputs to mapping the tree cover for the City of Jonesboro to aid in the development of an ordinance for increasing tree cover. Other work has utilized a combination of remote sensing, GIS, and hydrologic modeling to assess best management practices that help to reduce runoff of sediment and nutrients from agricultural fields. Dr. Baker teaches two undergraduate classes on precision agriculture and two graduate classes that cover the fundamentals of GIS and remote sensing. In the three years of his lab's operation, he has successfully directed one Ph.D student, Dr. Larry Stauber in 2003, and five masters students.

Scott Reeve, Associate Professor of Chemistry and Physics in the College of Science and Mathematics received his BA in Chemistry from Augsburg College and his Ph.D in Chemical Physics from the University of Minnesota. Scott began a tenure-track position in the Department of Chemistry and Physics at Arkansas State University in August of 1994 and is currently an Associate Professor.

During his tenure at Arkansas State, he has constructed an in-house pulsed molecular beam rapid scan infrared diode laser spectrometer with externally obtained funding and is using this instrument to examine the high resolution infrared spectra of organometallic compounds under super-cooled conditions. Recently, Scott began using an infrared diode laser spectrometer to perform trace gas analysis on the constituents in environmental tobacco smoke (ETS). The ETS work represents a collaborative effort with his colleague, Dr. William Burns.

Utilizing technology with Drs. Bill Baker and Scott Reeve

R.I.S.E. PROGRAM FOR 2004

Summer 2004 marked the second year for **Research Internships in Science of the Environment (R.I.S.E.)** within the College of Science and Mathematics. This program is funded by the National Science Foundation (NSF) and targets the educational needs of traditionally under-represented students.

Rising Junior and Senior college students who have completed general science courses (General Chemistry, General Biology and or Geology) are eligible to apply. The summer program involves a combination of highly individualized research experience, group seminars and field work.

Undergraduate scholars work directly with faculty mentors, often as part of a research team. The summer experience involves "hands-on" research in the laboratory and/or field in the exciting and diverse field of aquatic and environmental science. At ASU, students access state-of-the-art analytical facilities including ICP-MS and GC-MS as well as cutting-edge field equipment including data loggers and fish electroshock equipment. Scholars are afforded every opportunity to gain the analytical and field expertise needed to succeed in both post-graduate education and industry. Aside from analytical facilities, summer scholars have access to the university research library and computer facilities.

By preparing and presenting their research activities, undergraduate scholars summarize their summer research.

They came to ASU from across the nation to conduct research

R.I.S.E. STUDENTS-CONTINUED

Nine students participated in this summer's R.I.S.E. program with EVS faculty:

1) **Anh Nguyen**, a junior chemistry major at the University of Dallas, worked in the Laser Spectroscopy Laboratory with Dr. Reeve. Her research focused on the revibrational characteristics of compounds in tobacco smoke using FTIR and laser spectroscopy.

2) **Modupe Braithwaite**, a sophomore biology major at Florida Memorial College, worked in the Water-Rock-Life Laboratory with Drs. Anne Grippo and Robyn Hannigan. Her research assessed metal fractionation in ram sperm and blood using ICP-MS.

3) **Stacy Beharry**, a junior biology major at Morgan State University in Baltimore, worked with Dr. Tom Risch. Stacy's research explored the effect of parasites on bluebird health, specifically assessing changes in feather coloration with age and presence of parasites.

4) **Johnathan "JS" Woodward**, a sophomore biology major at Middlebury College, worked with Dr. Al Romero. JS's research explored the behavior of fish, specifically changes in light wavelength and the linkages of these changes to evolutionary strategies in blind cave fish.

5) **Reinique Mousseaux**, a senior environmental science major at Oglala Lakota College in South Dakota worked with Dr. Patrick Stewart. His research focused on evaluating Native American food and land ethics, particularly as they pertain to genetic modified organisms.

6) **Amy Shipley**, a junior biology major at the University of Toledo, worked with Dr. Jim Bednarz. Amy's research focused on bird ecology and health and the impact of pesticides on reproductive success.

7) **Michael Balfour**, a senior chemistry major at Morgan State University worked with Dr. Roger Buchanan. Michael's research focused on the impact of pesticides on brain function.

8) **Emy Laija**, a junior environmental science major at the University of Texas at El Paso, worked with Dr. Jerry Farris. Emy's research assessed the remediation of a contaminated site in Michigan and the changes in soil and water quality since the initiation of remediation.

9) **Michelle Trevino**, a senior biology major at Arkansas State University, worked with Dr. Ron Johnson. Michelle's research focused on the population genetics of the endangered Yellowcheek darter.

RECENTLY PUBLISHED

Baral, A. and **Guha, G.** 2004. Trees for carbon sequestration or fossil fuel substitution: The issue of cost vs. carbon benefit. *Biomass & Bioenergy*, 27 (1): 41-55.

Ford, A.R., Burns, W.A., and **Reeve, S.W.** 2004. Rotational analysis of FTIR spectra from cigarette smoke: An application of chem spec II in the undergraduate research laboratory. *J. Chem. Ed.*, 81, 865-867.

Ingram, D. and Tang, B. In press. Minimum *G* aberration design construction and design tables for 24 runs. *Journal of Quality Technology.*

Knight, A. and Warland, R. In press. Determinants of food risks: A multi-approach model. *Rural Sociology*.

Knight, A. and Warland, R. 2004. Understanding the relationship between socio-demographics and concern about food safety issues. *Journal of Consumer Affairs*, 38, 1: 107-120.

Lee, K.M., and **Gilmore, D.A.** In press. Fungal degradation of the bioplastic PHB (poly-3-hydroxybutyric acid). *J. Polym. Environ*., 13(2).

McLean, W. and **Stewart, P.A.** 2004. Inattention in the heartland: Awareness of the homeland security system in Arkansas". *PA Times,* 27(7):6.

Ogendi, G.M., **Farris, J.L**, and **Hannigan, R.E**. 2004. Black shale trace metal concentrations and toxicity: Preliminary findings. *Water Rock Interaction,* Vol 2: 1359 -1362.

Stephens, W.W. and **Farris, J.L.** In press. A biomonitoring approach to aquaculture effluent characterization in channel catfish fingerling production. Accepted in *Aquaculture*

Trauth, K.S., Berry, G.M., Burns, W..A., and **Reeve, S.W.** 2004. Infrared diode laser spectroscopy of jet cooled cobalt tricarbonyl nitrosyl. *J. Chem. Phys.*, 120 (9**)**, 4297-4305.

ASU ARKANSAS STATE UNIVERSITY

HIGHLIGHTS - NEWS, ACCOMPLISHMENTS & PRESENTATIONS

Dr. Gauri-Shankar Guha participated in a Global Economic Modeling workshop hosted by EcoMod at the Universite Libre de Bruxelles in July 2004. This workshop targeted developing computable general economic models for environmental impact assessment. Additionally he was co-awarded a grant (with Dr Kelly Fish of COB) to create an "International Business Resources Center" at ASU-COB for building export capabilities in Northeast Arkansas.

Dr. Hector Flores, Dean of Science and Mathematics, is busy with "traditional" Dean duties along with organizing an outreach program with the local high schools. The College of Science and Mathematics hosted students from Jonesboro High and the Governor's School of Science and Mathematics, for a four week experience with faculty mentors in the College. Research was complemented by readings from science novels and autobiographies.

Dr. Flores' new graduate student, Alejandra Ratti, will begin the Ph.D Program this fall. They will soon be setting up a laboratory in the new ABI building, in shared space with Hector's fellow Dean of Agriculture, Greg Phillips.

Dr. Greg Phillips announced a collaborative project between the Environmental Sciences Program and the College of Agriculture just east of Stadium Drive which will provide a series of ponds, irrigation ditches, and constructed wetlands to provide controlled, mid-scale facilities for conducting on-site research. This facility will link bench-top research conducted on-site with production farm sites. Water availability is becoming a critical issue in the sustainability of agricultural production in parts of the Mid-South region, and the impact of agricultural production practices on the environment is a major compliance issue regionally and nationally. For example, approximately 85% of water used in the state of Arkansas supports agriculture, and aquifer availability of water is diminishing.

Dr. Ronald Johnson implemented a grant with Dr. Jeannette Loutsch through the Arkansas Department of Higher Education to instruct high school teachers in laboratories utilizing molecular biology techniques. Research grants included study on the population biology and genetics of the Yellowcheek darter (USF&WS) with graduate student Michael Weston and RISE undergraduate student Michelle Trevino. He also received a grant from the Arkansas Game and Fish Commission with Dr. Stan Trauth and Ph.D student Joy Trauth to study the population genetics of the Illinois chorus frog.

Dr. Bill Stroud conducted two research trips this summer which included the study of land use problems associated with platted lands (old sagebrush subdivisions) in central Oregon and the hydrologic restoration of South Golden Gate Estates, a large antiquated subdivision located in the western Everglades ecosystem. These types of studies provide several research possibilities for the immediate future in this exciting area of land use and environmental planning.

Dr. Patrick Stewart served on two student Ph.D committees that graduated during the summer season, Anil Baral and William Stephens. He also received two grants in aid of research; one for the *Jonesboro Regional Chamber of Commerce Survey* and another from the Arkansas Biosciences Institute for *Perceptions, Management and Regulatory Enforcement of Agricultural Engineering* with Drs. **Andrew Knight** and Will McLean.

Dr. Stan Trauth's book, *Amphibians and Reptiles of Arkansas* is finding so much popularity that its first printing was sold out.

NABS

Several conferences were attended this summer. The North American Benthological Society (NABS) held its annual convention in Vancouver, BC. and was attended by **Sam McCord**, **Jennifer Bouldin**, **William Stephens**, **Jerry Farris** and **Nate Bickford** with the following presentations:

Evaluating Toxicity of Diazinon in Agricultural Associated Runoff Through Constructed Wetlands by **J.L. Bouldin, J.L. Farris**, M.T. Moore, S. Smith JR., and C.M. Cooper.

Considerations for Evaluating Water Body condition in agriculturally dominated drainage systems in the Mississippi and Arkansas deltas by **W.W. Stephens**, M.T. Moore, **J.L. Farris, J.L. Bouldin**, and C.M. Cooper.

Seasonal variation in the aquatic insect assemblage of an Ozark stream by **S.B. McCord** and P.R. Lambrecht.

Food or habitat limitation for tailwater brown trout growth? Implications for fishery management by S.C. Blumenshine and **R.L. Johnson.**

A multi-disciplinary approach to locating essential fish habitat in freshwater systems by **N. Bickford** and **R. Hannigan**.

A special thanks to **Melissa Hobbs** for helping organize the short course "*Teaching the Teachers"* at the Oxford, Mississippi Mid-South SETAC annual conference.

Mid-South SETAC

The regional Mid-South SETAC meeting was held in Oxford, Mississippi and attended by Jennifer Bouldin, Jerry Farris, Melissa Hobbs, Rich Grippo, Greg Phillips, George Ogendi, and Jon Maul with the following presentations:

The Confluence of Agricultural Production and Environmental Impacts in the Mid-South Region: Need for Coordinated Research Programs by **Phillips, G.C., J.L. Farris**, **C.R. Shumway**, and **J.L. Bouldin**.

Considerations for assessments of wadeable drainage systems in the agriculturally dominated deltas of Arkansas and Mississippi by **Stephens, W.W**., M.T. Moore, J.L. Farris, J.L. Bouldin, and C.M. Cooper.

Evaluating toxicity of diazinon in agricultural associated runoff through constructed wetlands by **Bouldin, J.L., J.L. Farris**, M.T. Moore, S. Smith Jr. and C.M. Cooper.

Environmental Effects of the Aquaculture Therapeutant Potassium Permanganate by **Hobbs, M.S., R.S. Grippo, J.L. Farris,** L.L. Harding, and B.R. Griffin.

The impact of black shale weathering on sediment quality by **Ogendi, G.M., R.E. Hannigan, J.L. Farris**, and D. Smith.

Irrigation options for best management practices – benefit/cost analysis, resource conservation, and ecological benefits by **Bouldin, J.L., N.A. Bickford, B. Stroud** and **G.Guha**.

Please send suggestions and comments to:

Arkansas State University

Marty Wolfe
Arkansas State University
Environmental Sciences Ph D Program
P.O. Box 847
State University, AR 72467

PHONE: (870) 972 2007
FAX: (870) 972 2008
EMAIL: mwolfe@astate.edu

Need something? Try our website!

http://evs.astate.edu

THE EVS MISSION

To produce scientists with the knowledge needed to support the assessment, maintenance and recovery of environmental resources. This includes an appreciation of the economic, social, political and aesthetic context that shapes our interaction with and knowledge of the environment. Measuring and understanding the balance between environmental protection, sustainable resource management, and economic growth is a major integrating theme within the program.

SAVE A TREE - If you would like an electronic copy of the newsletter contact Marty Wolfe (mwolfe@astate.edu) or visit our website under News & Information.

FEATURED LABORATORY— NEUROBIOLOGY RESEARCH LABORATORY

Dr. Malathi Srivatsan is determining the dose dependent toxic effects of organophosphates (OP) on somato sensory neurons of rats since clinical findings show that farmers handling OP pesticides exhibit impairment in their tactile sensation. Her laboratory cultures neurons from dorsal root ganglion of one-day-old rat pups and exposes them to OP and uses a fluorescence stain which specifically stains for dead neurons (red) and live neurons (green) to identify and evaluate neurotoxicity (Fig 1).

Research funding from ABI enables study of the effects of nicotine on developing neurons. Since smoking exposes a fetus and newborns to nicotine, exposure to cultured neurons from sympathetic ganglia is concentrated on neonatal rat pups. With different subtypes of nicotinic receptors, nicotine exposure significantly affects neurons expressing alpha-7 receptors.

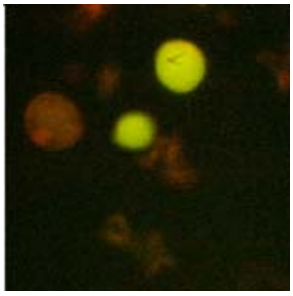

Fig. 1

After only 24hrs of nicotine exposure, the neurons exhibit a significant reduction in growth.

Neurons with alpha 7 sub units of nicotinic receptors show binding with FITC labeled alpha bungarotoxin (green fluorescence) under fluorescence microscopy (Fig.2a).

Same area of culture dish viewed under transmitted, phase contrast microscopy shows adjacent neurons without alpha 7 nicotinic receptors (non-fluorescent) show thick, short neurites while the ones with alpha 7 receptors show absence of neuritis (Fig. 2b).

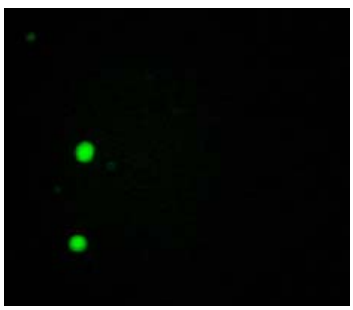

Fig. 2a

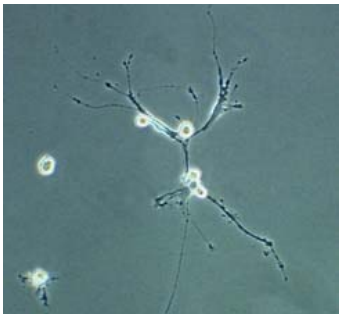

Fig.2b