



SWES SOUNDS



The Heartbeat of the Department of Soil, Water & Environmental Science

December 2006

Vol. 24,

Issue 9

Shantz Bldg. 38, Rm. 429

<http://ag.arizona.edu/SWES/>

Tucson, AZ 85721

TONES FROM THE TOOTH



The Soil, Water and Environmental Science (SWES) Department provides a strong set of diverse, innovative, and productive programs addressing a broad range of topics and issues within our area of study. The SWES Department is an excellent example of a dynamic unit within a land-grant institution. We direct outstanding programs in research, instruction, and extension education.

In the past several years we have seen a more concerted effort on the University of Arizona (UA) campus to marshal the collective forces in the broad arena of natural resources and environmental sciences. For example, these strengths at the UA were recognized and emphasized in the focused excellence reviews that included the Earth Sciences and Environmental Programs (ESEP) review project. At this university we have a tremendous collection of talent in this arena, ranging from the biological and physical sciences to areas of policy and the social sciences. Water sustainability programs for example have become an area of primary interest and a great deal of effort has been directed towards the development of collaborative projects. The Arizona Water Institute (AWI) has been formed to enhance our capacity to engage in cooperative efforts, not only across the campus but also across the State with ASU, NAU, and other agencies.

President Shelton has expressed a strong interest in emphasizing the role of the UA as a land-grant institution. He has also recognized the need and the capacity for the UA to more clearly establish its place in the areas of Earth Sciences and Environmental Programs as a real strength of this university. The SWES Department is an extremely important part of this effort and we will be a critical part of this process. Our programs are ready to step up to these challenges and we welcome the opportunity.

Jeffrey C. Silvertooth
Department Head



FEATURED FACULTY

Dr. Mark Brusseau



I have been a faculty member at the University of Arizona since November 1989. The primary focus of my research group is the transport, fate, characterization, and remediation of contaminants in the subsurface. Our research integrates theoretically and experimentally based investigations with the development and application of process-based mathematical models. Our projects range from investigations of pore-scale phenomena to field studies at hazardous waste sites. Contaminants of interest include chlorinated solvents, hydrocarbon fuels, pesticides, metals, and pathogenic microorganisms. Specific research interests include: (1) transport of reactive contaminants in physically and geochemically heterogeneous porous media; (2) inter-phase mass transfer processes such as sorption and immiscible-liquid dissolution; (3) the coupled interactions of physical/chemical processes and microbial activity, and the resultant impacts on biodegradation and transport of organic contaminants; (4) vapor-phase contaminant transport; (5) multi-phase fluid behavior; (6) development of innovative methods for site characterization; (7) development of source-zone remediation technologies; (8) pathogen transport. Two examples of current projects are presented below.

We are using a recently developed method, synchrotron X-ray microtomography, to investigate the pore-scale behavior of fluids in porous media. With this method, we can quantitatively characterize the distribution of fluids and porous-medium grains at the micrometer scale. Among other applications, this allows measurement of fluid-fluid and fluid-solid interfaces, which mediate fluid flow and component mass transfer in porous media. For example, we are investigating the functional dependency of air-water interfacial area on water saturation and porous-medium texture. We are also investigating the pore-scale behavior of immiscible organic liquids by, for example, integrating measurements of dissolution behavior with characterization of the water-immiscible liquid interface.

We have conducted several characterization and remediation demonstration projects at local, state, and federal hazardous-waste sites. For example, during the past twelve years, we have conducted a series of studies at the Tucson International

Airport Area federal Superfund site in Tucson. This site is contaminated with chlorinated solvents, and an extensive contaminant plume resides in the regional aquifer. These studies have included projects to characterize the architecture and mass-transfer dynamics of the primary source zones at the site, a large (50 km²) mathematical-modeling project designed to investigate the impact of source-zone mass flux on evolution of the groundwater contaminant plume as influenced by the pump-and-treat system, and demonstration projects to determine the effectiveness of innovative remediation technologies for the chlorinated-solvent contaminated source zones.

SWES NEWS:

CONGRATULATIONS!!!

The American Association for the Advancement of Science (AAAS) has named **Ian Pepper** as a 2006 Fellow. New Fellows are listed in the November 24 issue of *Science*.



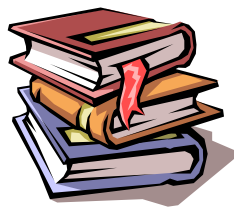
Congratulations to **Sangho Choi**, who successfully defended his PhD. Dissertation on November 17, 2006.

Congratulations to **Sarah Hayes** for winning a Student Showcase 2006 award! In the Agriculture & Environmental Sciences category, Sarah won 1st Place (\$250) for her presentation on lead speciation and mobility in mine tailings.

Congratulations to Denise Uyehara and Marcel Schaap on the birth of their son René Tingaara Uyehara-Schaap born on November 19, 2006.



SWES REPORT CARD:



PUBLICATIONS:

Marsett, R.C., J. Qi, P. Heilman, S.H. Biedenbender, **M.C. Watson**, S. Amer, M. Weltz, D. Goodrich and R. Marsett. 2006. Remote sensing for grassland management in the arid Southwest. *Rangeland Ecology and Management* 59(5):530-540.

Fan, H., D.J. Fairley, **C. Rensing**, **I.L. Pepper**, and **G. Wang**. 2006. Identification of similar non-thermophilic Crenarchaeota in four Chinese and American pristine soils. *Biodiversity Sciences*. 14:181-187.

G. Schnaar and **M.L. Brusseau**. Characterizing pore-scale dissolution of organic immiscible liquid in natural porous media

using synchrotron X-ray microtomography. *Environ. Sci. Technol.*, 40:6622-6629, 2006.

Cheng, L., Chetochine, A. S., Pepper, I. L., and Brusseau, M. L. Influence of DOC on MS-2 Bacteriophage Transport in a Sandy Soil. *Water, Air, and Soil Pollution*, doi:10.1007/s11270-006-9200-4, 2006.

Fairley, D.J., **G. Wang**, **I.L. Pepper**, **C. Rensing**, and M.J. Larkin. 2006. Expression of genes involved in aromatic degradation in two haloarchaeal genera. *Appl. Microbiol. Biotechnol.* 73: 691-695.



PRESENTATIONS:

Chris Rensing presented "Understanding the molecular genetics of the global arsenic cycle" at the University of California - Riverside, Riverside, CA, November 8th.

Ian Pepper attended the Northwest Biosolids Management Association Conference in Blaine, WA, Sept. 10-12.

Ian Pepper presented "Environmental Fate of Pathogens During the Land Application of Biosolids" at the IWA Conference - Sustainable Sludge Management: State of the Art Challenges and Perspectives, held in Moscow, Russia, May 29-31.

Kevin Fitzsimmons gave recruitment presentations on graduate student opportunities with the SWES Department "Recruiting graduate students for CONACyT scholarships" in Guanajuato, and Chapingo Mexico, Nov. 14-15.

Raina Maier presented "Biosurfactants – structure and commercial applications" to the UA Chemistry Club, Nov. 15.

The following were presented at the ASA-CSSA-SSSA International Meetings, Indianapolis, IN, Nov. 12-16:

Ian Pepper "Biologicals from Land Application of Biosolids and Manures: Apple Pie and Motherhood or Pandora's Box of Pandemonium"

R. Soto-Ortiz,* J.C. Silvertooth, and A. Galadima, "Nutrient uptake patterns in irrigated chiles (*Capsicum annuum* L.)."

R. Soto-Ortiz,* J.C. Silvertooth, and A. Galadima, "Nutrient uptake patterns in irrigated melons (*Cucumis melo* L.)."



PLANE TALK FROM ERL

Ian Pepper, Director

The Water Village continues to grow. House #1, the Point-of-Use facility and House #2, the Network Distribution Laboratory are both up and running with experimental projects underway. The next phase of construction involves expanding House #2 towards House #1 such that distribution systems in both houses can be connected. In addition, the model distribution network within House #2 will be expanded. Currently Drs. Gerba and Choi are responsible for these two houses. Shown below is an artist's impression of the new expansion, provided by Martin Yoklic. Pending permission from the airport and planning permission from the City of Tucson, we aim to initiate construction early in 2007.



BUSINESS OFFICE

Suzy Brown



New Travel Reimbursement Rates The University of Arizona mileage, lodging and per diem rates have been increased to reflect those approved for the State of Arizona. Therefore, travel expenses incurred on or after November 15th, will be reimbursed at the new rates. The default rates are \$60 for lodging and \$34 for meals & incidentals.

The Travel Expense Report eForm has been updated to reflect the new mileage rate of 44.5 cents per mile and the Travel sections of the FRS Departmental Manual have been updated to point to the new lodging and per diem rates at: <http://www.gao.state.az.us/publications/SAAM/SAAM-2d06-20061115.pdf>

Please contact Jose Montante, Financial Services Office, at (520) 621-7697 if you have any questions.



GRAD TIPS

Veronica Hirsch

Congratulations to each of our December 2006 graduates!

Marisa Chattman, M.S.

Sangho Choi, Ph.D.

Cheol Ho Heo, Ph.D.

Mohamed E. Hereher, Ph.D.

Chandra Deberta Holifield Collins, Ph.D.

Monica Orozco Mendez, Ph.D.

Piyachat Ratana, Ph.D.



Natthanich Sirikul, Ph.D.



REMINDERS:

The University of Arizona will be closed from December 25, 2006 through January 1, 2007. Have a wonderful Winter break and we will see you again in the Spring!! **GOOD LUCK WITH FINALS!!**

Classes will begin January 10, 2007!!

FOOD FOR THOUGHT:

Always remember that you're unique. Just like everyone else.

From: <http://humormatters.com/jokeof.htm>



| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|--|---|--|--|---|-------------------------------------|
| <h1>December 2006</h1>  | | | | | 1 | 2 |
| 3 | 4 Pablo Alanis-Gonzales S.W.E.S. Ph.D Student Efficacy of a Biofilter Integrated System with UV Light in Removing Pathogens from a Shrimp Culture SWES Department Seminar: 3p @ Marley - Rm. 230 | 5 | 6 LAST DAY OF CLASS!!! | 7 Reading Day!! NO CLASSES! !! | 8  | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 ETRs Due at noon TODAY Last Day of Finals Hanukkah Begins at Sundown | 16 |
| 17 | 18 | 19 | 20 | 21 | 22  | 23 |
| 24 | 25 Christmas Day University Closure | 26 Happy Kwanzaa!! University Closure | 27 University Closure | 28 University Closure | 29 University Closure | 30 University Closure |
| 31 Eid ul-Adha New Years Eve University Closure | January 1, 2007 HAPPY NEW YEARS!! University Closure | 2 | 3 | 4 | 5 | 6 |

NEWSLETTER TEAM: **Raina Maier, Ph.D.**
Editor

Brooke McCord
Coordinator and Distributor

Karen Josephson
Webmaster

* For questions, comments, suggestions, or feedback [contact Brooke McCord at 621-1646 or bmccord@cals.arizona.edu](mailto:bmccord@cals.arizona.edu)