



# SWES SOUNDS

THE UNIVERSITY OF  
**ARIZONA**  
COLLEGE OF AGRICULTURE  
AND LIFE SCIENCES

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

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## TONES FROM THE TOOTH

Research projects that address practical problems through the use of sound scientific principles and appropriate procedures are at the heart of most programs in the SWES Department. This is certainly consistent with the applied sciences that we commonly find throughout colleges of agriculture and life science and also in engineering at land-grant universities (like the UA).



Thus, it is somewhat ironic that one of the problems we face in many of our public universities today is a lack of relevance, at least as it perceived by the general public regarding many of our research programs. I believe this is true for the UA in general and I am concerned that this is a growing issue for many traditionally applied facets of our university. The fact that the general public does not see the university as relevant is demonstrated in the difficulties that we often have in securing support from the legislature and this is further exacerbated under severe economic stress.

Certainly the case can be made that we do indeed have a tremendously extensive list of offerings from our existing research programs that have the capacity to deal with and address practical problems relevant to society. Our challenge is to effectively communicate that fact. Clearly, the responsibility is directly incumbent upon university faculty to reach out to the public, openly engage the appropriate sectors, to communicate, and help facilitate the transfer of the appropriate information and technologies. This pertains to all faculty members, not just those with explicit Extension appointments.

In this case, I specifically identify and call upon the faculty and staff of the SWES Department to actively seek opportunities to extend their expertise beyond the academic sector and make an effort to address the problems and issues in the State and region. Every one of us needs to contribute in this manner. We do need to recognize that the "relevance" issue (particularly concerning the research portion of the enterprise) is important for our universities and society and that we need to address it effectively.

Jeffrey C. Silvertooth, Department Head

## Featured Visiting Scholar

I came last March, together with my husband Nico, to Tucson and I've worked since January 2009 as a visiting scholar in the group of Jon Chorover.



Back in Germany I studied Geology and (Water) Geochemistry and during my studies I worked in a XRD lab where I got interested in very fine-grained minerals, especially clay minerals, and their interaction with their environment. After my Diploma, I moved to Strasbourg (France) to do my PhD at the Center of Surface Geochemistry. I focused on swelling clay minerals that may be applied as part of the engineered barrier in the disposal of nuclear waste. For this experimental study I concentrated on basically two aspects: how does swelling clay behave under confined volume conditions (using experiments that simulated conditions in an underground disposal site) and how could microbial activity affect the performance of such a material under relevant conditions.

I especially appreciated the applied and interdisciplinary character of this work and so I was happy that I could continue working in this field here at the SWES department. My current research focuses on the interaction of typical soil bacteria (*Bacillus subtilis* and *Pseudomonas fluorescense*) and fine-grained minerals that are applied in pollution control (clay minerals and especially zeolites). Important questions that I address using a batch experimental approach include: how do different fine-grained minerals influence bacterial growth and how do bacteria in turn influence the performance of fine-grained minerals as contaminant metal sorbent. Two grant proposals are pending for this work.

Julia Perdrial

## DEPARTMENT NEWS:

International Programs Lunch for faculty will take place on July 15 (Wednesday) from 12:00 - 1:00 PM in Forbes 307. If you are interested in attending and have not already responded, please RSVP to Mary Riina ([mriina@email.arizona.edu](mailto:mriina@email.arizona.edu)).

BioMetals 2010, Tucson, AZ. Contact Chris Rensing for more information.

<http://www.biochem.arizona.edu/biometals2010/#>

Faculty routing proposals: When writing a budget justification narrative, please avoid or write more detail on the following items for operational costs: **Office supplies, printing, copying and paper.** All these items are now associated with red flags for Sponsored Projects

#### **Tools | Identity Theft Risk Assessment Quiz**

For the fifth year in a row, Arizona topped the list for identity theft. Although there is no way to guarantee that you won't become an identity theft victim, you can take precautions to limit opportunities and learn how to spot evidence of identity theft quickly. Rutgers University has developed an online quiz to assess the risk of becoming an identity theft victim. Take this free quiz: <http://njaes.rutgers.edu/money/identitytheft/>.

#### **GRADUATE STUDENT NEWS:**

Congratulations to **Eun-Hae Kim** who won best graduate student presentation for her talk: *Guided by thioethers: the RND way out for copper and silver* at the Wind River Conference in Estes Park, CO. June 3-7.

#### **SWES REPORT CARD:**

##### **Our Congratulations To:**

Three units at UA were honored by Secretary of the Interior Ken Salazar at a ceremony in Washington, DC on Thursday, May 7. The Department of the Interior's "Partners in Conservation Award" will be presented to the Tree Ring Lab, the Department of Agriculture and Resource Economics and the Arizona Water Institute (AWI). The award will be accepted by **Kathy Jacobs**, Director of the AWI, on behalf of the entire research team. The UA team contributed to an Environmental Impact Statement associated with new guidelines for shortage sharing and cooperative management of Lakes Mead and Powell on the Colorado River. The resulting "Interim Guidelines" are a major amendment to the "Law of the River," which is a collection of dozens of laws, court findings and operating agreements dating back to 1922. Kathy is the lead PI on the "Enhancing Water Supply Reliability on the Colorado River using Climate Information" project, and worked with doctoral student Dustin Garrick and Arizona water management stakeholders on assessing the implications of the alternative shortage sharing arrangements.

The Faculty of 1000 rates the recent Bagai, **Rensing**, Blackburn & McEvoy paper as "Exceptional" with a score of 9. The paper is entitled: "Direct metal transfer between periplasmic proteins identifies a bacterial copper chaperone" (2008) *Biochemistry* 47(44):11408-14.

#### **GRANTS:**

**K. Lansey, C. Choi, I. Pepper, C. Rock.** Changes in Reclaimed Water Following Treatment and During Storage. Water Reuse Foundation, (with USDA and HDR) \$300,000.

**S. Megdal** and R. Varady. International Workshop grant "Arizona-Israel-Palestine Water Management and Policy Workshop: Economic, Environmental, and Community Implications of Expanding Reuse and Desalination for Future Water Supplies". National Science Foundation. The workshop will be held in Tucson, Aug 31 – Sept. 2, 2009.

**P. Nagler and E. Glenn.** Riparian evapotranspiration studies on the Lower Colorado River. U.S. Bureau of Reclamation. \$89,500

**C. Rensing.** Targets of copper surface toxicity. International Copper Association. 2008-09. \$45,000.

**A. Ross** (working with **K. Bright** and **C.P. Gerba**). Use of metals for inactivation of microorganisms. Honors College Undergraduate Research Grant, \$1,300.

#### **PUBLICATIONS:**

**Bright, K. R., E. E. Sicairos-Ruelas, P. M. Gundy and C. P. Gerba.** 2009. Assessment of the Antiviral Properties of Zeolites Containing Metal Ions. *Food Environ. Virol.* 1:37-41.

**Brusseau, M.L., M., Narter, S. Schnaar, and J. Marble.** 2009. Measurement and estimation of organic-liquid/water interfacial areas for several natural porous media. *Environ. Sci. Technol.* 43(10): 3619-3625.

**Cai, L., L. Guanghui, C. Rensing, and G. Wang.** 2009. Genes involved in arsenic transformation and resistance associated with different levels of arsenic-contaminated soil. *BMC Microbiol.* 9: 4.

**Carroll, K.C. and M.L. Brusseau.** 2009. Dissolution, cyclodextrin-enhanced solubilization, and mass removal of an ideal multicomponent organic liquid. *J. Cont. Hydrol.* 106(1-2): 62-72.

**Carroll, K.C., R. Taylor, E. Gray, and M.L. Brusseau.** 2009. The impact of composition on the physical properties and evaporative mass transfer of a PCE-diesel immiscible liquid. *J. Haz. Mat.* 164(2-3): 1074-1081.

**Clasen, T., J. Naranjo, D. Frauchiger, and C. P. Gerba.** 2009. Laboratory Assessment of a Gravity-Fed Ultrafiltration Water Treatment Device Designed for Low-Income Settings. *Amer. J. Tropical Med.* 80:819-823.

Gerlak, A., S. Eden, **S. Megdal**, K. Mott Lacroix and A. Schwarz. 2009. Restoration and river management in the arid southwestern USA: exploring project design trends and features. *Water Policy* 11 (2009) 461–480.

Johnson, G.R., D.K. Norris, and **M.L. Brusseau**. 2009. Mass removal and low-concentration tailing of trichloroethene in freshly-amended, synthetically-aged, and field-contaminated aquifer material. *Chemosphere*, 75(4): 542-548.

Mena, K. D. and **C. P. Gerba**. 2009. Risk Assessment of *Pseudomonas aeruginosa* in Water. *Rev. Environ. Contam. Toxicol.* 201:71-116.

Truex, M.J., Oostrom, M. and **Brusseau, M.L.**, 2009. Estimating Persistent Mass Flux of Volatile Contaminants from the Vadose Zone to Ground Water. *Ground Water Mon. Rem.* 29(2): 63-72.

#### PRESENTATIONS:

The following were presented at the 15<sup>th</sup> International Symposium on Health-Related Water Microbiology. Naxos Island, Greece, May 31–June 6, 2009.

**Miles, S.L., R.G. Sinclair**, M.R. Riley, **I.L. Pepper**. Real Time Monitoring and Assessment of Pathogens in Water.

**Sinclair, R.G.**, L. Uisetiawan, **C.P. Gerba**. Microbial contamination in kitchens and bathrooms of Cambodian households: implications for hand washing programs.

**Miles, S.L.**, K. Takizawa, **C.P. Gerba, I.L. Pepper**. Fate of Prions in Potable Water.

Scott, B.A., **I.L. Pepper**. Water Distribution Systems as Living Ecosystems: Impact on Taste and Odor.

The following were presented at the National Ground Water Assoc. 2009 Ground Water Summit. Tucson, AZ, April 19-23.

**Berkompas, J.L.**, Field, J., Carreón Diazconti, C., and **Brusseau, M.L.** Assessing the Potential for Monitored Natural Attenuation at the Park-Euclid WQARF Site Using Compound Specific Isotope Analysis.

**Carroll, K.C.**, F.L. Jordan, **E.P. Glenn**, J. Waugh, and **M.L. Brusseau**. Nitrate Attenuation Characterization Methods for Groundwater Remediation in Monument Valley, Arizona.

**DiFilippo, E.L.** and **M.L. Brusseau**. Time-Continuous ANALYSIS of Mass Flux Reduction as a Function of Source ZONE Mass Removal at Two Field Sites.

**Russo, A.E.** and **M.L. Brusseau**. Experimental Investigation of Long-Term Removal of Trichloroethene from Various Porous Media.

The following were presented at the Goldschmidt Conference for Geochemistry, Davos, Switzerland, June 21-26.

**Legatzki, A., M. Ortiz, J.W. Neilson**, B.M. Pryor, L.S. Pierson III, and **R.M. Maier**. Bacterial and archaeal diversity in Kartchner Caverns, a carbonate cave in southwestern USA.

**Maier, R.M., J. Chorover, S.L. Iverson**, and **S.M. Hayes**. Combined FISH, u-XRF and SEM analysis to examine microbe-metal interactions on root surfaces.

**Neilson, J.W.**, J. Quade, J.L. Betancourt, and **R.M. Maier**. Hyperarid extremophiles: A comparison of bacterial communities from distinct locations in the core of the Atacama Desert.

**Ortiz, M., A. Legatzki, J.W. Neilson**, B.M. Pryor, L.S. Peirson III and **R.M. Maier**. Intra- and inter-speleothem variability of bacterial communities in Kartchner Caverns.

**Solis-Dominguez, F.**, and **R.M. Maier**. *Prosopis juliflora* and mycorrhizal fungi to revegetate arid acidic, metalliferous desert mine tailings.

**Elguindi, J.**, C. Andrade, H. Hasman, and **C. Rensing**. Significant differences in survival rates on copper surfaces between copper-resistant Gram-positive and Gram-negative bacteria. Tucson Nurses Week Foundation Conference and Health Fair. Tucson, AZ, May 8.

**Gerba, C. P.** Life in a Petri Dish. Annual Meeting of the Organization for Safety and Aseptic Procedures. Dallas, TX, June 13.

**Gerba, C. P.** Infection Control with Dr. Germs. Annual Meeting of the Medicinal National Distribution Association. Orlando, FL, June 8.

**Gerba, C. P.** The Ecology of *Naegleria fowleri*. Florida of Department of Health telecast series on Water and Foodborne Diseases. Tallahassee, FL, June 26.

**Gerba, C.P.** Infection Control at Work: Reducing the Risk. Continuing education webcast lecture for Cleanlink Education Systems.

**Gerba, C. P.** Molecular Mechanisms of Viral Survival and Transport in the Subsurface. First International Conference of the Transport of Microorganisms in the Subsurface. Niagara on the Lake, Canada. May 14.

**Jiang, Z., A.R. Huete**, Y. Wang, A. Lyapustin. Evaluation of MODIS VI products using the AERONET-based Surface Reflectance Validation Network dataset. 4th Global Vegetation Workshop. MT, June 16-19.

**Renising, C.** Site Directed Mutagenesis Identifies a Molecular Switch Involved in Copper Sensing by the Histidine Kinase CinS in *Pseudomonas putida* KT2440. Wind River Conference. Estes Park, CO, June 3-7.

**Silvertooth, J.** Using Heat Unit Tracking to Predict Chile Growth and Manage Inputs. Chile Mechanization Working Group. Deming, NM, June 23.

**Solano, R. and A. Huete.** Analysis of the 2005 Amazon drought with 9 years of multiple MODIS products. 4th Global Vegetation Workshop: Long term global monitoring of vegetation variables using moderate resolution satellites. Missoula, MT, June 16-19.

Zapata C., **S. L. Maxwell**, D. R. Macinga, M. L. Dolan, **C. P. Gerba** and J. R. Arbogast. Opportunistic Pathogens on the Hands of Students and Staff in an Elementary School using Contaminated Bulk Soap. Boston, MA, June 27.

Zapka C., C. Bond, **S. Maxwell**, E. Campbell, D. Macinga, M. Dolan and **C. Gerba**. Handwashing with Contaminated Soap Results in Hand Contamination and Transfer of Bacteria. Annual Meeting of the National Environmental Health Association. Atlanta, GA, June 22.

**Zerzghi, H.G., M. Banerjee**, S. Bengson, **I. Pepper**. Bacterial Community Analysis of Mine Tailings Amended with Biosolids. American Society for Microbiology, 109<sup>th</sup> General Meeting. Philadelphia, PA, May 17-21.

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## PLANE TALK FROM ERL

*Ian Pepper*



News on the Water Village..... The “Low Energy Wastewater Treatment Lab” is now up and running under the direction of Dr. Jim Field (ChEE). Anaerobic digesters now bubble and goggle while annamox bacteria wriggle in glass columns replete with exotic sights, sounds (and smells!). So if you want to visit the dark side, come and check out these new phenomena. Also, we are now retrofitting the conference room building as we turn it into an “Outreach and Education Center for Water Reuse.” This will consist of the conference room for teaching, a wet lab, and a computer lab. To do this we have knocked out several internal walls of the complex, as part of a major upgrade. Alas, the old kitchen in the complex no longer exists. This summer we are hiring four high school teachers to

develop a water reuse curriculum for K-12 students. We are also collecting videos on water as well as developing several videos ourselves.

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**End of Year Party at Zachary’s**

Thank you to our private donor for the pizza!!