



SWES SOUNDS

THE UNIVERSITY OF
ARIZONA
COLLEGE OF AGRICULTURE
AND LIFE SCIENCES

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

March/April 2009
<http://ag.arizona.edu/SWES/>

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Tucson, AZ 85721

TONES FROM THE TOOTH

The Soil, Water and Environmental Science (SWES) Department just completed the Academic Program/CSREES Review (APR) site-visit that is mandated on a six to seven year cycle for all University of Arizona academic departments by the Arizona Board of Regents. The first step was the development of the departmental self-study document which took place during the summer and fall of 2008. The self-study was an excellent opportunity for a summary and evaluation of SWES and what has (or has not) taken place over the past 7 years since our last APR in 2002.



An outstanding Review Team was assembled to administer the APR. This Review Team consisted primarily of external members but also included two members from the UA and one industry representative (also an alumnus of our department). The Review Team was well-prepared, combining their review of our self-study document with their own experience and expertise. They had many very good questions and comments that resulted in a very open and rigorous review.

Before they left, the Review Team presented their preliminary findings to SWES, the CALS Deans, and the Provost. These included a very strong and positive assessment of SWES and a clear endorsement of the vision and directions that were presented to them in the self-study and reinforced during the site-visit. They concluded that our efforts to orient SWES programs in the areas of Critical Zone Science and Water Quality are well-directed and productive. They also keyed in on the balance and coordination of our major program areas in instruction, research, and extension programs.

In the midst of the many challenges and difficulties we face these days at all levels (nationally, regionally, at the UA, and in the SWES Department) it is good to receive this strong and positive review for the people and programs in our department. This serves to reinforce the work and objectives we strive to achieve. This review also serves to amplify (with force and strength) our message to CALS and the UA that the SWES Department is a strong and significant entity in the area of Earth and Environmental Science.

Jeffrey C. Silvertooth, Department Head

SWES REPORT CARD:

DEPARTMENT NEWS:

Our Congratulations To:

Chuck Gerba who was elected a fellow of the American Association for the Advancement of Science

Sharon Megdal who was elected to the Board of Directors of the Central Arizona Water Conservation District.

Chris Rensing who was appointed as a Guest Professor from July 1, 2008 to July 1, 2011 at Huazhong Agricultural University, Wuhan, China.

Chuck Gerba accepted a position on the editorial board of the "Journal of Environmental and Food Virology".

Allan Matthias served on the NSF Graduate Research Fellowship Program panel (Plant and Other Life Sciences Panel), February 9-11, Arlington, VA.

Markus Tuller and **Marcel Schaap** organized the annual W-1188 Soil Physics Multistate Research Project Meeting "Contributions and Interrelations between Soil Physics and Ecology, Pedology, Soil Biogeochemistry, Climatology and Related Disciplines", at Biosphere II, Jan. 4-7.

Jeffrey Silvertooth provided introductory remarks and invited keynote speakers included: **Jon Chorover** (geochemistry), **Craig Rasmussen** (pedology), **Mike Crimmins** (meteorology).

GRADUATE STUDENT NEWS:

Our Congratulations To:

Phyllis Berger, an M.S. student working with **Markus Tuller**, was the 2008 recipient of the AWSS \$500 travel scholarship.



Sonia Fankem (Ph.D. **Gerba**) who successfully defended her dissertation "The Role of Fomites in the Transmission of Norovirus".

Patricia Gundy (M.S., **Gerba**) who successfully defended her thesis "Survival of Coronavirus in Water and Wastewater".

GRANTS:

J. Chorover and R. Maier. Nano-Scale Mechanisms of Metal(loid) Rhizostabilization in Desert Mine Tailings, NIEHS, \$825,000 1/09 – 12/11.

E. Glenn. Phytoremediation of a nitrate-contaminated former uranium mill site in Monument Valley AZ, DOE, \$252,000.

M. McEvoy (P.I.) and **C. Rensing.** Supplement to: The Role of Protein Interactions in Microbial Copper/Silver Resistance, NIH, \$168,409, 7/08 – 6/10.

C. Rock. 4-H₂O Replenish Project Grant, Coca Cola, \$30,000.

C. Rock. Characterizing the Sources of Microbial Contamination: DNA Source Tracking of Excessive *E. coli* in the Santa Cruz River Tumacacori NHP, AZ, National Park Service. \$10,000.

M. Tuller, T.Huxman, C. Rasmussen, and M. Schaap. Upgrade of Weighing Lysimeter Facility for Studying Ecosystem and Vadose Zone Dynamics in Arid Environments, NSF EAR Instrumentation Grant, \$263,553.

M. Tuller et al. High-Resolution Thermal Imaging: A Novel Tool to Study Soil Evaporation and Plant Water Relations, TRIF WSP, \$63,058.

PUBLICATIONS:

Aguilar-Barajas, E., E. Paluscio, C. Cervantes, and **C. Rensing.** 2008. Functional expression of chromate-resistance genes from *Shewanella* sp. Strain ANA-3 in *Escherichia coli*. FEMS Microbiol. Lett. 285: 97-100.

Blair, B., P. Dakar, K. R. Bright, F. Marciano-Cabral, and **C. P. Gerba.** 2008. *Naegleria fowleri* in well water. Emerging Infectious Diseases 14:1499-1500.

Chen Lopez, J.C., P. Waller, G. Giacomelli, and M. Tuller, 2008. Physical Characterization of Greenhouse Substrates for Automated Irrigation Management. In: Kubota C. and M. Kacira, Proc. Intern. Workshop on Greenhouse Environmental Control and Crop Production in Semi-Arid Regions. Acta Horticulturae, No. 797, 333-338.

Crimmins, T.M., **M.A. Crimmins,** D. Bertlesen. 2009. Flowering range changes across an elevation gradient in response to warming summer temperatures. Global Change Biol.. doi: 10.1111/j.1365-2486.2008.01831.x.

Davidson, E. A., D. B. Dail, and **J. Chorover.** 2008. Iron interference in the quantification of nitrate in soil extracts and its effects on the hypothesized abiotic immobilization of

nitrate. Biogeochem. DOI 10.1007/s10533-008-9231-6. 90, 65-73.

Gerba, C. P. 2008. Adenoviruses. Encyclopedia of Public Health. Elsevier, NY.

Gerba, C. P. 2008. Pathogen removal. In: Biological Wastewater Treatment, Modeling and Design. IWA Publishing, London, UK.

Gundy, P.M., C.P. Gerba, and I.L. Pepper. 2009. Survival of coronaviruses in water and wastewater. Food Environ. Vir. 1:10-14.

Iverson, S.L., and R.M. Maier. 2009. Effects of compost on colonization of roots of plants grown in metalliferous mine tailings, as examined by fluorescence in situ hybridization. Appl. Environ. Microbiol., 75:842-847.

Kim, M., C. Y. Choi, and **C. P. Gerba.** 2008. Source tracking of microbial intrusion in water systems using artificial neural networks. Water Res. 42:1308-1314.

Malek, M., E. Barzilay, A. Kramer, B. Camp, L. Jaykus, B. Escudero-Abarca, G. Deric, P. White, **C. Gerba,** C. Higgins, J. Vinje, R. Glass, M. Lunch and M. Widdowson. 2009. Outbreak of norovirus infection among rafters associated with packaged delicatessen meat, Grand Canyon, 2005. Clin. Infect. Dis. 48:31-37.

Maier, R.M. , I.L. Pepper, and C.P. Gerba. 2009. Environmental Microbiology, Academic Press, San Diego, CA.

Megdall, S. Preventing a Dry Future, *Building & Construction Southwest*, Winter 2008 Edition (December 2008), 8-9.

Megdall, S. 2008. Agricultural Water to Municipal Use: The Legal and Institutional Context for Voluntary Transactions in Arizona, with Robert Glennon, Alan Ker, Gary Libecap, Susanna Eden and Taylor Shipman, *The Water Report*, 58:9-20.

Megdall, S. Arizona's Groundwater Savings Recharge Program, with Taylor Shipman, *Southwest Hydrology*, May-June 2008.

Miles, S.L., C.P. Gerba, I.L. Pepper, and K.A. Reynolds. 2009. Point-of-use drinking water devices for assessing microbial contamination in finished water and distribution systems. Environ. Sci. Technol. 43:1425-1429.

Miller, J.D. , H.D. Safford , **M.A. Crimmins** and A.E. Thode. 2009. Quantitative Evidence for Increasing Forest Fire Severity in the Sierra Nevada and Southern Cascade Mountains, California and Nevada, USA. Ecosystems, 12:16-32, DOI 10.1007/s10021-008-9201-9.

Nwachuku, N. and **C. P. Gerba**. 2008. Occurrence and persistence of *Escherichia coli* 0157:H7. Rev. Environ. Sci. Biotech. 7:267-273.

Or, D., **M. Tuller**, and S.B. Jones, 2009. Liquid Behavior in Partially Saturated Porous Media under Variable Gravity, Soil Sci. Soc. Am. J., 73(2):1-10.

Pepper, I. L., H. Zerzghi, J. P. Brooks and **C. P. Gerba**. 2008. Sustainability of land application of Class B biosolids. J. Environ. Qual. 37:558-567.

Rodriguez, R. A., I. L. Pepper and **C. P. Gerba**. 2009. Application of PCR-based methods to assess the infectivity of enteric viruses in environmental samples. Appl. Environ. Microbiol. 75:297-307.

Rodriguez, R. A., **P. M. Gundy** and **C. P. Gerba**. 2008. Comparison of BGM and PLC/PRC/5 cell lines for total culturable viral assay of treated sewage. Appl. Environ. Microbiol. 74:2583-2587.

Scott, M., Nagler, P., Glenn, E., et al. 2009. Assessing the extent and diversity of riparian ecosystems in Sonora, Mexico. Biodiversity and Conservation 18(2):247-269.

Sinclair, R. G., C. Y. Choi, M. R. Riley and **C. P. Gerba**. 2009. Pathogen surveillance through monitoring of sewer systems. Adv. Appl. Microbiol. 65:249-269.

Tanner, B.D., J.P. Brooks, **C.P. Gerba**, C.N. Haas, K.L. Josephson, and **L.L. Pepper**. 2008. Estimated occupational risk from bioaerosols generated during land application of Class B biosolids. J. Env. Qual. 37:2311-2321.

PRESENTATIONS:

The following were presented at the SSSA International Annual Meeting, Houston, TX, October 5-9, 2008.

Berger, P.A., R. Heinse, **M. Tuller**, S.B. Jones, **M.G. Schaap**, and **J.F. Artiola**, 2008. Physical and Hydrological Characterization of Mine Tailings A First Step for Revegetation with Native Plant Communities.

Berger, P.A., **M.S. Meding**, **M. Tuller**, **M.G. Schaap**, and **C. Rasmussen**, 2008. Particle Size Analysis with Laser Diffraction Comparison to Standard Methods.

Iassonov, P., and **M. Tuller**. Segmentation of X-Ray Computed Tomography Images: A Crucial Step for Quantitative Analysis of Porous Structures.

Tuller, M., and **Th. Gebrenegus**, 2008. Polypropylene Fiber Amendments to Alleviate Initiation and Evolution of Desiccation Cracks in Bentonite Liners.

Viola, R., P. Macini, E. Mesini, and **M. TULLER**, 2008. Non-Darcy Flow: Correlation between Inertial Coefficient

and Particle Size Distribution of Unconsolidated Porous Media.

Berger, P.A., R. Heinse, H. Abdu, **M. Tuller**, S.B. Jones, **M.G. Schaap**, and **J.F. Artiola**, Geophysical Characterization of Inactive Mine Tailings A First Step for Economical Design of Vegetative Covers. AGU, San Francisco, Dec. 10-19, 2008.

Chen Lopez, J.C., P. Waller, G. Giacomelli, and **M. Tuller**, Physical Characterization of Greenhouse Substrates for Automated Irrigation Management. ISHS Intern. Workshop on Greenhouse Environmental Control and Crop Production in Semi-Arid Regions, Tucson, AZ, October 20 -24, 2008.

Gerba, C. P. Public cross-contamination the cleaning industry's I the International Sanitary Supply Association. Orlando, FL. October 22, 2008.

Gerba, C. P. Occurrence, fate and transport of water-based pathogens in distribution systems. Biofilm Workshop. Georgia Institute of Technology. Atlanta, GA. October 29, 2008.

Gerba, C. P. The impact of global warming on water quality. International Association for Food Protection European Meeting on Food Safety. Lisbon, Portugal. Nov. 21, 2008.

Gerba, C. P. Reinventing hygiene for the 21st century. UNESCO Center for Water Education. Delft, Netherlands. December 10, 2008.

Gerba, C. P. Home hygiene. Proctor and Gamble Asian Research Center. Kobe, Japan. January 5, 2009.

Iassonov, P., and **M. Tuller**. Recent Advances in Quantitative Image Processing. Synchrotron Environmental Science IV Meeting, San Francisco, CA, Dec. 11-13, 2008.

Maier, R.M. Phytostabilization of mine tailings in arid and semi-arid environments. NIEHS Risk-e-Learning Phytoremediation Seminar Series, Nov. 25, 2008.

Maier, R.M. Analysis of unique microbial communities from low nutrient environments. UA Microbiology Lunch Seminar Series, Tucson, AZ, Sept. 11, 2008.

Megdal, S. The Quest for Long-Term Water Resource Planning, American Water Resources Association National Conference, New Orleans, LA, Nov. 19, 2008.

Megdal, S. Conserve to Enhance: Voluntary Municipal Conservation to Support Environmental Restoration, American Water Resources Association National Conference, New Orleans, LA, Nov. 17, 2008.

Ravishankar, S., L. Zhu, and **C. Rensing**. Antibacterial effects of copper alloy surfaces on *Salmonella enterica*. Ann. Mtg. Inst. Food Technologists. New Orleans, June 28 – July 2, 2008.

Rensing, C. Love hurts: holding hands with copper. University of Nebraska, Lincoln, NE, July 29, 2008.

- Rock, C.** Future of Arizona NEMO: Watershed Based Plans and Non-point Source Pollutant Assessment Tools. National NEMO Conference, Asilomar, CA, Oct. 21, 2008.
- Rock, C.** Water Recycling and Landscape Irrigation. Yuma Tree and Landscape Expo, Yuma, AZ, Oct. 25, 2008.
- Rock, C.** Got Microbiology? Maricopa Agricultural Center Field Day, Maricopa, AZ, Nov. 1, 2008.
- Rock, C.** Water Quality and Environmental Impacts in Oak Creek Canyon. Coconino County Master Watershed Stewards Workshop, Sedona, AZ, Nov. 14, 2008.
- Rock, C.** Molecular Source Tracking using Real-Time Quantitative PCR to identify sources of microbial water pollution in Slide Rock State Park, AZ. Arizona Department of Environmental Quality, Phoenix, AZ, Dec. 4, 2008.
- Rock, C.** Seasonal Reclaimed Water Quality; an Assessment of Nutrient, Chemical, and Biological Variability. NSF Water Quality Center Semi-Annual Meeting, Tempe, AZ, Dec. 8, 2008.
- Rock, C.** Assessing Microbial Water Quality and Non-point Source Pollution with Molecular Source Tracking. Watershed Management Group, Tucson, AZ, January 15, 2009.
- Rock, C.** Water Quality 101. Master Watershed Stewards, Safford, AZ, February 4, 2009.
- Rock, C.** Status of Generation, Reuse and Recharge of Treated Wastewater in Arizona; Evaluation of Programs, Data Sources and Utilization Opportunities. USDA-CSREES National Water Conference, St. Louis, MO, February 11, 2009
- Schaap, M.** Author or co-author on three presentations, AGU meeting, San Francisco, CA, December 16-19, 2008.
- Schaap, M.** accepted an invitation to talk in two different sessions of the SIAM Geoscience conference in Leipzig, Germany, June 15-18, 2009.
- Silvertooth, J.** Physiological Basis for Nitrogen Demand in Cotton. Joint Annual Meeting. Houston, TX. Oct. 7, 2008.
- Silvertooth, J.** Nutrient Management in Arid Region Crop Production Systems. Congreso Internacional en Ciencias Agrícolas. Mexicali, Mexico. October 23, 2008.
- Silvertooth, J.** Evaluation of Residual Nitrogen Effects on Irrigated Cotton. Beltwide Cotton Conferences. Jan. 7, 2009.
- Silvertooth, J.** Fertilizacion en Algodon. Manejo del Algodonero en el Valle de Mexicali. Mexicali, Mexico. Jan. 21, 2009.
- Singh, S.K., S. Franke, J.T. Hazzard, A. Weichsel, S.A. Roberts, **C. Rensing**, and W.R. Montfort. Copper binding, oxidation and oxygen reduction in the multicopper oxidase CueO. Protein Society, San Diego, CA, July 19-23, 2008
- Tuller, M., P. Iassonov, and Th. Gebrenegus**, 2008. Advanced Techniques for Segmentation of X-Ray Computed Tomography Images of Geomaterials. AGU Fall Meeting, San Francisco, CA, December 10-19, 2008.

VIDEOS:

Megdal, S. Keeping Water Knowledge Flowing, Video about the Water Resources Research Center produced by WebsEdge for the Amer. Water Res. Assoc. National Conf., Nov. 2008.

PLANE TALK FROM ERL

Ian Pepper




New NSF Center

The UA NSF Water Quality Center (WQC) was originally funded in 1999, with a 5 year renewal in 2004. During this 10 year period the Center received total funds in excess of \$10m and became a founding member of the UA Water Sustainability Program. The WQC focuses on research that provides good quality drinking water, i.e., “water with acceptable purity, taste and odor characteristics, which is safe with respect to human health and welfare.” This year the WQC has become a member of a new NSF funded Center—the Water and Environmental Technology (WET) Center. The initial administrative NSF award is \$1.24m for the three universities involved: Temple University; University of Arizona; and Arizona State University. The addition of Temple University will provide enhanced expertise in the emerging contaminant arena including pharmaceuticals and personal care products. The NSF award is for 5 years with additional funding from the private and public sectors. The new WET Center will allow the WQC to continue funding a state-of-the-art intermediate field-scale testing facility at ERL called the Water Village. The Water Village focuses on future treatment and distribution of water and wastewater, with enormous potential benefits for the community. In addition, the Center will remain a key member of the Water Sustainability Program, a UA leader in water research, education and policy. With a woeful economy and hard times everywhere, we are very grateful for the new funding.



Real-time monitoring and sensor lab at the Water Village

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|--|---|-----------|---|---|----------|
| <h1>March 2009</h1>  | | | | | | |
| 1 | 2 Seminar Jutta Elguindi and Cesar Hernandez 3:00 Marley 230 | 3 | 4 | 5 | 6 ETRs Due at Noon TODAY | 7 |
| 8 | 9 Seminar Alys Thomas and Rafael Martinez 3:00 Marley 230 | 10 | 11 | 12 | 13  | 14 |
| 15 | 16 | 17  | 18 | 19  | 20 ETRs Due at Noon TODAY | 21 |
| SPRING BREAK | | | | | | |
| 22 | 23 Faculty Meeting 1:00 FCS 219 | 24 | 25 | 26 | 27  | 28 |
| 29 | 30 Seminar Dr. Susan Brantley Penn State University 3:00 Marley 230 | 31 | | | | |

NEWSLETTER TEAM: [Raina Maier, Ph.D.](#)
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