



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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Department Head

TONES FROM THE TOOTH

I try to meet with SWES graduate students once or twice per year. The last meeting was in the latter part of Spring Semester when I scheduled two open discussion sessions for graduate students.



Several interesting points were presented in these sessions that are worthy of immediate attention. Graduate students presented their concern that too many of our graduate level courses are offered in the fall semester. This presents problems for them in developing a balanced plan of study with respect to coursework. This seems to be a particular problem for our three core courses (Environmental Physics, Environmental Microbiology, and Environmental Chemistry). This was discussed at our recent SWES faculty retreat (3 May) and we are working on adjustments to the SWES course schedule.

We also discussed the feeling that there lacks a strong sense of "community" for graduate students in SWES. I know that we have recognized this as an issue in SWES before. We commonly attribute this problem to the fact that we are severely dispersed (physically) among four buildings on campus and ERL off campus. While this is an issue, it is not an excuse. Poor seminar attendance is probably most symptomatic of the lack of community in SWES. The fact that we are busy (people travel and other commitments develop) and programmatically diverse (so that not all seminar topics are directly relevant to each program) makes it even more important that everyone attend seminar. This is a minimum in the effort to develop and maintain a sense of departmental community. Very simply, we need to be honest, realistic, face the facts, and step up to do a better job – beginning with the SWES faculty who must set an example for students. I am working with the faculty to address this issue and improve our Department in this respect.

I enjoy the openness and candor provided by the students in the SWES Department and I appreciate the constructive comments that have been offered. We will make the effort to respond to these comments and suggestions constructively and hope that these actions will improve the experience of our graduate students in SWES.

Jeffrey C. Silvertooth

FEATURED FACULTY

Dr. Michael Crimmins, Associate Professor



My position as a Climate Science Extension Specialist has brought many new and exciting challenges over the past two years. Most of my recent work has focused on drought monitoring and planning across Arizona. I am a member of the Governor's Drought Task Force-Monitoring Technical Committee and meet each month with representatives from state and federal agencies to evaluate recent hydroclimatic conditions and recommend changes to our state drought status maps. This information is forwarded to the Governor each month and to a larger coordinating group consisting of additional local, state and federal agencies that evaluate changes in drought status with respect to emerging or ongoing impacts. This group meets quarterly and makes recommendations to the Governor to raise or lower state drought declarations. A state drought declaration has been in place and upheld for several years now in response to ongoing drought conditions.

My participation with the Monitoring Technical Committee (MTC) has allowed me to lend climate science expertise to the group as well as identify potential research needs. I have three research projects underway that are in direct response to needs identified through the MTC or the lead agency, Arizona Department of Water Resources. A volunteer precipitation monitoring network has been developed (<http://www.rainlog.org>) to help close monitoring gaps across rural Arizona as well as engage citizen scientists on the issue of climate variability and drought. An Arizona specific drought impacts reporting system is also under development with support from the Water Resources Research Center, SAHRA, Arizona Dept. of Water Resources, USDA-Natural Resources Conservation Service and the National Drought Mitigation Center. This online tool will support in the collection of county level drought impacts information through Local Drought Impacts Groups organized through county Cooperative Extension. This local information will be used to adjust state-level drought status maps so that they reflect observed impacts with respect to hydroclimatic changes. The information will also be used to assess county level drought vulnerability and used in local drought planning and water conservation efforts. More

information on these projects and my program can be found at: <http://cals.arizona.edu/climate>.

SWES REPORT CARD:



AWARDS:

Dawit Zerihun, Alex Furman, **A. W. Warrick** and Charles Sanchez received the 2007 Best Paper Award for their article, "A coupled surface-subsurface solute transport model for irrigation borders and basins, I. Model development, and II. Model evaluation," in the *Journal of Irrigation and Drainage Engineering* (American Society of Civil Engineering).

GRANTS:

K. Fitzsimmons, 2007, US-AID, \$69,000. "Sustainable Coastal Aquaculture in the Tsunami Impacted Regions of Indonesia and Thailand."

Fitzsimmons, K. and **O.T. Urquidy**, 2007, US Fish and Wildlife Service, \$20,000. "Coordinate Multi-Agency Efforts for Aquatic Nuisance Species Control on the Lower Colorado River."

C. Rensing, 2007, International Copper Association, \$10,000.

O.T. Urquidy, 2007, Arizona Water Institute, \$5,000 matching funds internship. "Coordinate Multi-Agency Efforts for Aquatic Nuisance Species Control on the Lower Colorado River."

PUBLICATIONS:

Allen, H.E., J.M. Bahr, P.C. Bennett, K.P. Cantor, J.A. Centeno, L.K. Cohen, P.E. Epstein, W.G. Ernst, S.H. Hearne, J.D. Mayer, J. Patz, **I.L. Pepper**, and C.W. Skinner. 2007. *Earth materials and health: research priorities for earth science and public health*. National Academies Press.

Dowd, S.E. and **I.L. Pepper**. 2007. *PCR: Agricultural and Environmental Applications for Soil Microbes*. Manual of Environmental Microbiology, Third Edition. ASM Press. 676-686.

Franke, S. and **C. Rensing**. 2007. Acidophiles: mechanisms to tolerate metal and acid toxicity. *Physiology and Biochemistry of Extremophiles*. 271-278.

PRESENTATIONS:



The University of Arizona

July 2007

Vol. 26, Issue 7
Department of Soil, Water, & Environmental Science

Fitzsimmons, K. "Problems with Collection of Production Data for Global Tilapia Aquaculture". UN-FAO forum, Stavanger, Norway, April.

Gerba, C.P. presented the following:

-Keynote presentation: "The Significance of Fomites in the Transmission of Disease". Annual meeting South Carolina Branch American Society for Microbiology, Columbia, SC, April 13.

-Keynote presentation: "Beware of the Fomites". Northern Ohio Branch of the American Practitioners of Infection Control Annual Meeting, Toledo, OH, April 17.

-Keynote presentation: "The Role of Fomites in Disease Transmission". Annual meeting Connecticut Valley Branch American Society for Microbiology, Storrs, CT, April 19.

-"Occurrence of *Naegleria fowleri* in Drinking Water Wells". Second International Conference on *Gardia* and *Cryptosporidium*, Morelia, Mexico, May 16.

-Invited guest for the first meeting of the "Cleaning Industry Research Institute (CIRI)", Las Vegas, NV, May 1. CIRI is designed to provide research funding for the cleaning industry.

Grandlic, C.J., S.L. Iverson, M.O. Mendez, and R.M. Maier. Evaluation of potential plant growth-promoting bacteria and their use to enhance *Atriplex lentiformis* and *Buchloe dactyloides* growth in acidic mine tailings. American Society for Microbiology 107th General Meeting, Toronto, Ontario, May 21-25.

Maier, R.M. Fitoestabilizacion de Jales Mineros en Medio Ambientes Aridos y Semi Aridos. Fifth Specialized US-Mexico Binational Center Workshop "Health Effects and Remediation of Mine Tailings" San Luis Potosi, MX, June 4-6.

Morrero-Ortiz, R. Assessment of the Microbial and Chemical Quality of Individual and Small Systems in Arizona. Annual Meeting Arizona Water Pollution Control Association, Mesa, AZ, May 3.

Sarkar, P. Occurrence and Control of *Naegleria fowleri* in Drinking Water Wells in Arizona. Annual Meeting Arizona Water Pollution Control Association, Mesa, AZ, May 3.

Silvertooth, J.C. presented the following:

- "Cotton and Melon Crop Production". Desert Valleys CAPCA, Yuma, AZ, April 19.

- was a participant and guest at The Golf and Environmental Foundation of Arizona, Golf Industry Day at the Arizona Capital, Phoenix, AZ, March 6.

College of Agriculture and Life Sciences

-“Cotton Management for Optimum Efficiency: Yield and Fiber Quality”. 2da Reunión Técnica Binacional sobre la Calidad de la Fibra del Algodonero, Mexicali Baja California, MX, May 2.

- “Updates in Crop Management for Chiles and Melons”. AZ Crop Protection Association, Desert Ag Conference, Casa Grande, AZ, May 10.

-“ Arizona Pest Control Advisor Manual – Updates and Revisions”. AZ Crop Protection Association, Desert Ag Conference, Casa Grande, AZ, May 10.

PLANE TALK FROM ERL

Ian Pepper, Director

The WQC Spring 2007 meeting was held May 14. The meeting was highly successful with 26 research projects reported on by U of A and ASU faculty.

Research focal areas included:

Potable Water Treatment; Microbial Monitoring of Potable and Source Waters; Biosolids and Land Application; Remediation; and Endocrine Disruptors.



Some examples of projects relevant to potable water were:

- Determination of Ct Times for UV/Ozone/Silver Disinfectants
- Control of Emerging Waterborne Parasites: *Naegleria fowleri*
- Fate of Prions in Groundwater, Reclaimed Wastewater and Land Applied Biosolids
- Novel Desalination Technology for Potable Water Productions
- Microbial Monitoring of Source Waters
- Effect of Chlorination and Rechlorination on Taste and Odor in Drinking Water Distribution Systems
- High Capacity, Environmentally Benign Sorbents for Treating Arsenic Regenerant Streams
- Point-of-Use Drinking Water Devices for Assessing the Extent of Microbial Contaminants in
- Finished Water and Distribution Systems
- Bacterial Community Analysis of Municipal Tapwaters and Their Influence on Taste and Odor
- The Water Village

BUSINESS OFFICE

Eddie Camacho



Please join us in welcoming Gabriella “Gaby” Cordova, the new Accounting Specialist in the SWES Business Office.



FOOD FOR THOUGHT:

WHAT IS A WATT? REVISITED

Janick Artiola, Professor

Most of us (I hope) are becoming more aware of our energy use (footprint) and the need to reduce it to help mitigate the global warming effect. In March 2002, energy reduction tips were distributed from the U of A Facilities Management Energy Conservation Task Force. Please, link to the website and review them. There are also some very good home energy tips.

<http://www.fm.arizona.edu/conserves/estips.cfm>. If you print a copy, please post it for others to read.

Keep in mind that most energy (>80%) is still produced via fossil fuel burning.

A Watt-hour is a unit of energy per unit time. Your electric bill is provided in kW-h (1000Watts per hour).

ONE kW-hour of energy produces 1-2 lbs of carbon dioxide gas, depending on the fuel (hydrocarbon) source used to generate and it also requires 0.5-1 gallon of fresh water.

So, how quickly can we spend **ONE** kW-h of power? Here are several examples:

- Leave a 200 watt-hour desktop PC **on** for five hours. (hint: to save energy use the PC standby mode and switch off monitor)
- Leave a 35 watt-hour LCD screen **on** for a day.
- Leave a 13 watt-hour fluorescent light bulb on for about three days.
- Leave a 3 watt-hour VCR, or TV or DVD or LCD... **on standby** mode 24hours/day for two weeks. (for more information of this link to: <http://www.powerint.com/greenroom/faqs.htm>)
- Use a 1300 watt-hour toaster or hair blow drier only three minutes every day for a week.

-Leave a 1 watt-hour DC power supply plugged into the wall socket for about 6 weeks, even when not connected directly to any electrical appliance. Yes, these pesky DC power supplies that have crept up into our modern life are now populating many of our wall electric outlets. By the way, when plugged in these transformers emit a fair amount of electrical and magnetic (EM) radiation within a short range (1-3 feet) as they are inductors (coiled cooper wires). So, unplug them from the wall when possible. The jury is still out on the exposure effects to these constant sources of EM radiation. For more information on this subject, browse through chapter 21 of our recently

published second edition of **Environmental Pollution Science**.

If you want to conduct an energy use audit in your house I recommend a plug in watt meter that you can get at newegg.com for about \$25. You will be amazed as I was to see the amount of energy leakage that is constantly occurring in modern homes. Despite gains made in energy use efficiencies of many appliances, the proliferation of DC power supplies, larger TV flat screens* and "standby mode" appliances seems to offset some of the gains made by replacing incandescent light bulbs with the efficient (~4 times) fluorescence bulbs.

So, whenever possible switch off lights and turn off or better yet unplug appliances AND external power supplies. (hint: to save energy connect several appliances to single power strip that you can switch off when not in use)

*A 42" flat screen LCD TV consumes about 250 watt-hour or about twice as much energy as an old 36" TV set.

Given all of these passive and active ways of using electricity, it is easier to understand how the average US home uses 12,000 to 16,000 kW-hour of electricity annually. How many metric tons of carbon dioxide is this? You do the math, use coal as a source for the electricity which generates 2 lbs of CO₂/kW-h). (hint: 1kg=2.2lbs)

Now, as you know, the energy and therefore carbon dioxide gas emissions footprint left by our cars is also quite significant. As a reminder, each gallon of gasoline burned produces about 17 lbs of carbon dioxide.

Ten thousand miles (annual average) driven in a car that gets 25 miles/gallon releases 6,800 lbs (~3 metric tons) of carbon dioxide into the atmosphere. From this benchmark it is easy to compare the emissions of a 12.5 mile/gallon car with one that gets 50 miles/gallon.





By now it should be evident that while some electrical equipment has become a lot more energy efficient, the proliferation of electronics has in many ways cancelled these savings. Take for example the switch from CRTs to LCDs. In this case the increased size of the screen has whipped out the energy savings. For example an old vacuum tube 36" TV uses about 120 watt-hour of power, but the increasingly popular 40 42" LCD TVs use about 250 watt-hour (a similar sized plasma TV uses 350 watt-hour).

Count the number of DC power (transformers) supplies that have creped up into your office or house in the last few years and the numbers are staggering --- each using 0.5 to 3 or more watt-hours just by being plugged in.

FYI 1: A vacuum tube (CRT) PC monitor uses about 80-120 watts (that is watts-hour) of power operating and 10 watts on standby. Turning them off either automatically or using the standby function will save about 1/2-1/3 of the energy used by your PC. In addition, if you are in the market for a new PC or monitor, you should consider buying an LCD (flat screen). The latest generation of LCDs has excellent color and text resolutions. The best thing is that they use 30 watts operating and 2-5 watts on standby. Other advantages that about LCDs include: small print, 12-17 pound weight, small footprint, no radiation, no glare, and no harmful chemicals inside (such as lead).

FYI 2: The U of A spends more than \$14M a year in electricity. There is an effort underway to replace thousands of low efficiency fluorescent lights on campus buildings. It will cost the U of A more than \$4M but this will result in annual savings of \$1.5M.



Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<h1>July 2007</h1> 						
1 Creative Ice Cream Flavor Day 	2	3	4 Independence Day 	5 Last day of classes for 1 st Summer Session	6 	7 Chocolate Day 
8	9 Classes Begin for 2 nd Summer Session	10	11	12	13 ETRs Due at Noon TODAY	14
15	16	17 Faculty Meeting, FCS Rm. 219, 11:00 am-12:00pm	18	19	20 	21
22	23	24	25	26	27 ETRs Due at Noon TODAY	28
29 Rain Day 	30	31				

NEWSLETTER TEAM: **Raina Maier, Ph.D.** Editor **Carmella Kahn** Coordinator and Distributor **Karen Josephson** Webmaster

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