Fall 2012
http://ag.arizona.edu/SWES/

A POROUS MEDIA

Jon Chorover, Department Head

An article published recently in the peer-reviewed journal Science of the Total Environment found the University of Arizona to be the most productive university in the United States for top-cited publications pertaining to the field of “environmental science”— and the fourth most productive institution in this regard worldwide. The authors employed the Thompson Reuters Web of Science database to measure institutional contributions to 181 environmental science journals listed in Journal Citation Reports. Productivity of the UA was exceeded worldwide only by the U.S. Geological Survey, Brunel University (UK), and the U.S. Environmental Protection Agency, which were ranked 1 to 3 respectively.

The same study found the United States to be by far the most productive country in respect to publications in environmental science. The authors define environmental science as a “multi-disciplinary field” that “specifically focuses on water, air, soil and climate research.” UA’s strength in this area derives from the breadth and depth of faculty, students and staff in the College of Agriculture and Life Sciences (Department of Soil, Water and Environmental Science, School of Natural Resources and Environment), the College of Science (Departments of Atmospheric Science, Geosciences, Hydrology and Water Resources) and the College of Engineering (Department of Chemical and Environmental Engineering). The USGS actually maintains a regional office on the UA campus with strong program connections in CALS and other colleges.

The UA confers undergraduate and graduate degrees in Environmental Science through SWES. CALS faculty also lead several university-wide, inter-college research efforts such as the National Institute of Health-funded Superfund Research Program (www.superfund.pharmacy.arizona.edu), the National Science Foundation-funded Critical Zone Observatory (www.czo.arizona.edu), and the Santa Rita Experimental Range (http://www.snr.arizona.edu/project/srer).

The article by Khan and Ho indicates that these and many other similar efforts across the UA campus are giving rise to impactful environmental science publications in the top-cited journals in the field. For further details, see Khan, M.A. and Ho, Y.S. (2012) Top-cited articles in environmental science: Merits and demerits of citation analysis. Science of the Total Environment, 431: 122-127 (http://bit.ly/U90aCu).

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FEATURED RESEARCHER

Markus Tuller

I joined the SWES Department in 2007 and I’ve enjoyed being part of the diverse and vibrant UA community since. Being a native of Austria and spending time at Utah State University and the University of Idaho prior to my appointment at UA, I was always surrounded by abundant water and lush greenery. I still remember when I flew to Tucson for my job interview, and looked down on the brown and uninviting Sonoran desert, and thought that there was no way I could enjoy living in such environment. Once on the ground and after a hike through Saguaro National Park, I recognized the immense diversity of desert plants and animals and all the green not visible from the plane, and immediately fell in love with the desert and Tucson’s mixture of Hispanic and American culture. I consider myself lucky for the opportunity to teach and conduct research here.

I have a variety of research interests that align with the overarching topic of “Critical Zone Science,” mainly with mass and energy transfer within the soil and in the atmosphere. I am involved in numerous projects with national and international collaborators. Motivated by the obvious trend of global warming and in view of potential federal regulations, my students and I are currently heavily involved with the development of cost-efficient novel means to measure greenhouse gas emissions from natural ecosystems and agricultural operations under varying environmental conditions. Another one of my favorite projects is the application of X-Ray Computed Tomography to determine pore morphological and hydraulic properties of soils. This project has wide-ranging implications for environmental remediation and many other applications, such as oil recovery. For an in-depth overview about our research please visit our webpage at http://ag.arizona.edu/swes/soilphysics/.

I thank all my students for engaging in all the exciting projects and contributing to new knowledge that hopefully will benefit society at large. Besides research I enjoy teaching Soil Physics (SWES 470/570) and Modeling of Mass and Energy Transport in Soils (SWES 605; with Marcel Schaap). On a final note, I want to mention that I am currently responsible for the SWES Graduate Programs. I encourage all graduate students to seek advice and consultation if problems surface during their time with the SWES Department; my door is always open.
SWES REPORT CARD

PUBLICATIONS


PRESENTATIONS


The University of Arizona  Fall Vol. 31, Issue 4  College of Agriculture and Life Sciences Department of Soil, Water & Environmental Science


**CONGRATULATIONS**

**Karletta Chief,** an adviser of the UA American Indian Science and Engineering Society (AISES) student chapter, recently announced that her students received a mini-grant from NSF Geosciences Directorate for an outreach project called Mother Earth and her Ecosystems: Research, Education and Outreach Opportunities for Native High School Students. More information is available in an article (http://bit.ly/UA4SaX) and a video (http://bit.ly/W3BWJh) relating to this event.

**Linnea Herbertson,** a SWES master’s student working with Raina Maier, was the first woman to cross the finish line in El Tour de Tucson in November. She finished the 109 mile race in 4:39:03. Details are given in an Arizona Daily Star article: [http://bit.ly/SOUY1W](http://bit.ly/SOUY1W).

**Corin Hammond** won the American Chemical Society Women’s Chemist Group Award at the Student Showcase in November. She also won second place for the Graduate awards at the showcase.

**Alejandro Badilla** won in the area of Agriculture and Environmental Sciences at the 20th Annual Student Showcase. He also won the Bio5 Innovator Award.

**Rebecca Lybrand** won the Joe Dixon Award for best graduate student presentation in Soil Mineralogy at the 2012 Soil Science Society of America Meetings in Cincinnati, Ohio.

**Charles Gerba** received an award for Outstanding Contributions to the Field of Food and Environmental Virology from the International Association for Food and Environmental Virology.

**Kelly Bright and Charles Gerba** were appointed to the Arizona Department of Environmental Quality Emerging Contaminates Advisory Panel.

**David Walker** was chosen as a contributing author for the book “Soul of Science,” by local artist Daniel Martin Diaz. For more information, please see: [http://kck.st/WiI3MT](http://kck.st/WiI3MT).

**Laura Sifuentes,** who was a student in the Gerba lab, completed the requirements for her Ph.D. She is now a SWES research associate working with Kelly Bright.

**Roberto Rodriguez,** worked with Charles Gerba to earn his Ph.D., accepted a position as an assistant professor at the University of Texas, School of Public Health in El Paso, Texas.

**Marylyn Yates,** another former Ph.D. student of Charles Gerba, was recently appointed dean of the College of Natural Resources and Agricultural Science at the University of California, Riverside.

**Michael Crimmings** and **Melanie Lenart** won the 2012 Outstanding Team Award in the College of Agriculture and Life Sciences with a dozen other Cooperative Extension affiliates.

The winning CALS Environment and Sustainability Extension Signature Program Team members worked with UA Extension county agents Christopher Jones and Mark Apel. Members received the recognition for their efforts in helping natural resource managers work toward sustainability in the face of climate change.


**Papuga Lab group wins awards**

Students working in the laboratory of Shirley Papuga won student poster awards at the Sixth Annual Phenology Research and Observations of Southwest Ecosystems (PROSE) Symposium on the UA campus on Oct. 12.

**Jessica Swetish,** a senior in SWES, took first place for her poster on "Influence of understory greenness on trace gas and energy exchange in forested ecosystems."

**Evan Kipnis** took second place for his poster on "Insights on ecohydrological controls of phenological events in Larrea Tridentata through continuous monitoring using digital cameras."

**Maria Pilar Cendrero Mateo,** a SWES Ph.D. student, took third place for her poster on "Steady-state chlorophyll fluorescence (Fs) as a tool to monitor plant drought stress."
DEPARTMENT NEWS

SWES students sweep IE Grad Blitz

Graduate students in the Department of Soil, Water and Environmental Science won some top awards at the Environmental Research Grad Blitz held in November by the interdisciplinary UA Institute of the Environment.

The first prize winner for a talk was Stefan Walston (above, being congratulated by Rafe Sagarin of the IE), a SWES master’s student who splits his time working in SWES assistant professor Channah Rock’s lab in Maricopa and the lab of Jean McLain on campus. His talk on “Does increasing solids retention time in the wastewater treatment process affect the persistence of antibiotic resistance genes?” also won an award for Best Science/Society Linkage award for a presentation connecting scientific research to a societal need.

Natalie Brassill, also a SWES master’s student, won Audience Choice for best poster, for “Assessment of Escherichia coli as an indicator of microbial quality of irrigation waters used for produce.” Brassill, whose major advisor also is Rock, works in the campus lab of Charles Gerba and also in the Yuma Agricultural Center.

Jason Torrey, a SWES Ph.D. student working in Charles Gerba’s lab, won Audience Choice for best talk for “Antimicrobial properties of metal nanoparticles.” For more information on this event, which featured 27 talks and 24 posters, go to: http://www.environment.arizona.edu/grad_blitz/2012/speakers.

ERL helps jumpstart new SWES lab group

The Virginia Rich Microbial Ecology Lab appreciates the thoughtfulness of Ian Pepper, head of the Environmental Research Laboratory, regarding some furniture the ERL was discarding in preparation for an upcoming move. The Rich group found six desks and chairs and a table that were ideal for their new SWES-communal office space. Dr. Pepper even arranged for an ERL crew to bring these heavy furniture pieces up to Saguaro Hall. The Rich lab appreciates all the help.

SWES Sounds student worker graduates

Josef Hae-Chan Lee, a social and behavioral student in Economics who has assisted with SWES Sounds since 2011, is graduating this fall. In addition to providing a draft layout of the issues for the past year and a half, he designed the new heading featured on the front page of this issue. We wish him good luck in his new job at the Vanguard office in Phoenix.

GRANTS

Chief, K., and A. Serrat-Capdevila and A. Meadow. Climate change vulnerability of Native Americans in the Southwest: Pyramid Lake Paiute Tribe. USGS, $202,525.

Chief, K., S. Megdal, E. Shamir, S. Eden, and C. Castro. Incorporating climate information and stakeholder engagement in groundwater resources planning and management. NOAA Climate and Societal Interactions Division, $227,500.


Chief, K. and S. Johnson. Mother Earth and her ecosystems: research, education, and outreach opportunities for Native high school students. NSF Geosciences Mini-Grant. American Indian Sciences and Engineering Society, $6,924.

Gerba, C.P. Assessment of a UV water treatment system for microbial performance. Waterlogic, $19,000.

J. Drewes, S. Snyder and C.P. Gerba. Role of retention time in the environmental buffer of indirect potable reuse projects. WaterReuse Foundation, $348,000.

J. Rose, C.N. Haas and C.P. Gerba. QMRA Innovation Institute: linking microbiology, engineering and mathematics for water research. National Science Foundation, $100,000.


Papuga, S., P. Brown, and J. Walworth. Quantifying pecan water use in Arizona. Arizona Department of Agriculture Specialty Crop Block Grant Program, $94,112.

Thenkabail, P.S. Global Cropland Area Database (GCAD30) through Landsat and MODIS data fusion for the years 2010 and 1990 and its dynamics over four decades using AVHRR and MODIS. NASA, $3.5 million.

Walker, D. Establishing narrative nutrient criteria for Arizona lakes and reservoirs. ADEQ, $55,000.

Yoklic, M. Baltimore urban housing and green infrastructure planning, research and development. USDA, FS, FPL, $90,000.

PLANE TALK FROM ERL

Ian Pepper, Director

Well, it’s official – the WEST Center has been approved by the Pima County Board of Supervisors and the UA Board of Regents.

The Water & Energy Sustainable Technology Center – known as the WEST Center – will be constructed by Pima County Wastewater as part of a new Water Reclamation Campus. The building with associated technology is projected to cost $8 million to $10 million, under the following schedule:

- January 2013, design, planning, bids;
- June 2013, commence construction;
- March 2014, move in.

That means we are now going to rip ERL apart in earnest. It will be sad, but “new” is good and a new ERL will emerge at WEST. So, all of you who have enjoyed free parking at the ERL site, located next to the Tucson International Airport, when going on trips – enjoy it – it’s for a limited time only!