

Kirkham Conference Facilitates Soil Physics Discussion, Debate

by Keith L. Bristow

The third quadrennial Kirkham Conference was held at the University of California (UC) in Davis from 24–26 Feb. 2008. Sponsored by SSSA and the UC Davis Department of Land, Air, and Water Resources, the theme for this year's conference was "Soil Physics—Research on the Frontiers of Earth's Life Support System."

The Kirkham Conference honors the late Don Kirkham, Curtiss Distinguished Professor of Agriculture and Professor of Physics, and his wife Betty. It provides a forum in which researchers can explore and discuss disciplinary and interdisciplinary subjects of soil physics in ways seldom possible at national or international meetings. The aim is to learn from disciplines outside of, but related to, soil physics in order to enhance and communicate knowledge of soil physics and its application to increasingly complex challenges in a wide range of areas, including agricultural production and environmental stewardship. Attendance is by invitation and is generally less than 50 people.

The conference was opened by Professor Barry M. Klein (vice chancellor of research and professor of physics at UC Davis), who highlighted the importance of soils and their service to society, especially in the areas of health, food, and the environment. The organizers succeeded in addressing the aims of the conference by securing a range of stimulating speakers who covered a wide range of topics over the two days, which facilitated good discussion and debate. The speakers also kindly agreed to share their presentations more widely, and I recommend gaining a closer experience of the conference by accessing the recorded lectures via the conference website at <http://ag.arizona.edu/kirkham/davis.htm>.

Topics Address Soil Complexity

Topics such as flow and transport in porous media, measurement, pre-

diction, scale, heterogeneity, connectivity, thresholds, complexity, and complex adaptive systems were discussed. These discussions highlighted the fact that soils are probably the most difficult and complex materials known to man, their properties are still not well known, sophisticated instrumentation and measurement capabilities are needed to access and study soils, and some of the most complex and difficult mathematics is needed to help understand them. This led some to suggest that more funding and greater expertise needs to be focused on these issues to facilitate more rapid progress in understanding and managing soils. It was also noted that the Prediction in Ungauged Basins (<http://pub.iwmi.org/>) initiative stated at one of its recent meetings that soils were the last great frontier needing significant breakthroughs to support the next generation of advances in hydrology.

Some key questions arising from the conference included:

- How accurately can we measure and model soil respiration?
- Is Darcy's law valid within rooting systems?
- How can the economic value of groundwater versus surface water be used to drive future research in the vadose zone?
- What is the "natural capital" of soil, and how do we value it?
- How useful are our current soil physics models for making predictions?
- If we could describe (model) infiltration perfectly at a point, how do we apply that knowledge at different scales?
- How do we identify and address the most important questions in soil physics?
- Are there some large international questions (e.g., salinity, land cover) that can be used to foster collaboration and funding?

Twelve postgraduate students from around the world were also invited to participate and share their work via poster presentations. The breadth and quality of work presented by these students and their active engagement over the two days suggests that soil physics continues to attract highly creative and talented people and that we should continue to see significant contributions from soil physics in tackling a wide range of increasingly difficult and complex soil and environmental problems.

Top Soil Physicists Recognized

The conference dinner provided an opportunity for further mingling and discussion amongst participants and some relaxation! Highlights included presentations of the Don and Betty Kirkham Soil Physics Award to all 10 of the recipients since 1998 and the first Don and Betty Kirkham Soil Physics Medal to Don Nielsen, emeritus professor of soil and water science at UC Davis. The Soil Physics Award is announced at the SSSA Annual Meetings and recognizes a midcareer soil physicist who has made outstanding scholarly and educational contributions to advance the field of soil physics. The Soil Physics Medal is awarded every eight years to an exceptional individual



Mary Beth Kirkham presents the Don and Betty Kirkham Soil Physics Medal to Don Nielsen, emeritus professor of soil and water science at UC Davis, in recognition of his career achievements and professional service activities and his commitment to science in general and soil physics in particular.

who has consistently made unique and outstanding contributions to soil physics throughout their career.

The energy created and obvious success of the Kirkham Conference has prompted further thought about how to expose more of the soil physics community to its benefits while meeting the original objective of a small, informal, and highly interactive gathering. As noted above, the presentations were recorded and are available via the web, and while this may help, I am also interested in other ideas you may have to broaden the exposure and benefits, especially using technology. Another option that could be considered is introducing an application procedure for midcareer scientists similar to that currently used for postgraduate students. Any thoughts you may have regarding these issues can be sent to David Robinson at darearthscience@yahoo.com.

Finally, I would like to thank the organizing committee for attracting a range of stimulating speakers and for running a well-structured but flexible conference. The facilities and environment created certainly helped promote debate and discussion, with some discussions continuing late into the night, each night! So thanks to all members of the organizing committee including Jan Hopmans (Chair), Brent Clothier, Dani Or, Jirka Simunek, David Robinson, and Markus Tuller. Special thanks to Atac Tuli, who worked quietly in the background ensuring everything ran smoothly and that all participants were well looked after.

The Kirkham Conference is supported by SSSA members who launched two funds: the Don and Betty Kirkham Fund and the Lena and Maria van der Ploeg Fund. Both funds are administered by the Agronomic Science Foundation (ASF). Further information about the conference is available at <http://ag.arizona.edu/kirkham/>.

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