King-Jau Samuel Kung
Professor, Soil Science Department

Academic and Professional History:

- PhD in Biological and Environmental Engineering at Cornell University with major in Soil and Water Engineering and minor in Fluid Mechanics.
- In 1986, joined University at Wisconsin-Madison.

Research focus: My research program has been focused on quantifying the impact of modern land use on the degradation of water quality. I have specifically examined the environmental fate and transport mechanisms of chemicals from agricultural systems and waste disposal. My research on preferential flow in both sandy soils and silty loams resolved three central issues: 1) why discrepancies existed between contaminant transport phenomena observed in the laboratory-scale and the field-scale experiments; 2) how to interpret field-scale contaminant leaching data with tremendous spatial variability; and 3) what are the optimum chemical application and/or disposal schemes to minimize total leaching

Graduate Training focus: My earlier effort has been focused on training graduate students to use analytical, numerical, and experimental approaches to solve problems involving water movement, heat transfer, and contaminant transport in unsaturated soil. Because physics, chemistry, geology, and biology not only naturally converge but also strongly interact in natural environments, the capacity of synthesizing will dictate whether graduate students could make fundamental contributions to the advancement of Soil and Environmental Sciences. Therefore, during the last three years, my major investment in teaching is to train graduate students to holistically demonstrate how soils support life in terrestrial ecosystems through facilitating the coupled hydrological and biogeochemical cycles.

Current Research Support:

- USDA Higher Education Challenge Grant Program; Seeing is Believing - Use of Multi-Media Video in the Instruction of Soil Science and Environmental Quality; 08/00 to 07/03; $237,500; PI
- USDA-ARS Cooperative Grant; Herbicide leaching in temperate and tropical environments; 11/99 to 10/01;$118,000; PI
- USDA HATCH; Quantifying field-scale preferential flow; 08/00 to 07/03; $60,000; PI
- USDA-National Research Initiatives; Quantification and Evaluation of Subsurface Water Dynamics for Determining Water and Chemical Fluxes on Adjacent Watersheds; 07/01 to 06/04; $255,000; Co-PI.

Select Publications:

- Ju, S-H., and K-J.S. Kung. 1997. Impact of funnel flow on contaminant transport in sandy soils: Numerical simulation & Steady-state funnel flow: Its characteristics and impact on modeling. Soil Sci. Soc. Am. J. 61:416-435.
- Kung, K.-J. S., T. S. Steenhuis, E. J. Kladivko, T. J. Gish, G. Bubenzer, and C. S. Helling. 2000. Impact of Preferential Flow on the Transport of Adsorbing and non-Adsorbing Tracers. Soil Sci. Soc. Am. J. 64(4) 1290-1296.
- Kung, K.-J. S., E. Kladivko, T. Gish, T.S. Steenhuis, G. Bubenzer, and C.S. Helling. 2000. Quantifying Preferential Flow by Breakthrough of Sequentially-Applied Tracers: Silt Loam Soil. Soil Sci. Soc. Am. J. 64(4) 1296-1304.
- Jaynes, D.B., S.I. Ahmed, K-J S. Kung, and R.S. Kanwar. 2001. Temporal Dynamics of preferential flow to a subsurface tile drain. Soil Sci. Soc. Am. J. 65:1368-1376.
- Gish, T., W.P. Dulaney, K-J S. Kung, C.S.T. Daughtry, J.A. DooLittle, P.T. Miller. 2002. Evaluating use of GPR for identifying subsurface flow pathways. Soil Sci. Soc. Am. J. 1620-1629.