Pruess 2006 O.E. Meinzer Award Recipient

by Michael Celia

Dr. Karsten Pruess, 2006 O.E. Meinzer Award Recipient

The 2006 O.E. Meinzer Award recipient is Dr. Karsten Pruess of Lawrence Berkeley Laboratory. For more than 25 years, Dr. Pruess has been at the forefront of scientific studies of complex problems involving fluid flow in natural porous media. His work has strong scientific content, important practical value, and has impacted and involved many other researchers.

Pruess earned his PhD in Theoretical Physics in 1972 and arrived at LBL in 1975 as a Research Fellow in the Nuclear Theory Group. In 1977, he joined the Earth Sciences Division at LBL where he is currently employed. He has authored more than 125 journal papers across a range of important topics and he authored the TOUGH2 family of computer codes.

Dr. Pruess's first hydrogeology research focused on geothermal systems, which was a natural extension of his background in physics. After working on this problem for the better part of a decade, Karsten began to work on other problems involving non-isothermal and multi-phase flow in porous media. These included high-level radioactive waste disposal, steam injection to remove non-aqueous-phase liquid (NAPL) contaminants, multi-phase flow in fractures, the role of preferential flow in unsaturated soils, fundamental numerical simulation methods for multi-phase and unsaturated-zone flow systems, and the incorporation of geochemistry into non-isothermal multi-phase simulations. Most recently, he has been working on the problem of injection of supercritical CO_2 for the purpose of carbon mitigation, where the idea is to capture CO_2 before it is emitted to the atmosphere, and inject it into deep subsurface formations so that it remains out of the atmosphere for hundreds to thousands of years, or more. Dr. Pruess has taken a leading role in the scientific investigations of the hydrogeological aspects of this strategy. He and his coworkers have looked particularly at storage capacities and the influence of subsurface heterogeneities, at possible leakage pathways and their impact on the efficacy of the approach, at geochemical responses of the system and the overall long-term fate of the injected carbon, and at the complex role of phase-change and thermodynamics on possible catastrophic releases to the land surface.

Dr. Pruess embodies the best in research and scientific study: he produces outstanding science, he works on problems that have tremendous societal impacts, and he does so with humility, grace, and quiet confidence. For these reasons, the GSA Hydrogeology Division presents its 2006 O.E. Meinzer Award to Dr. Karsten Pruess.

O.E. Meinzer Award Papers

Pruess, K., J.S.Y. Wang, and Y.W. Tsang. On Thermohydrological Conditions Near High-Level Nuclear Wastes Emplaced in Partially Saturated Fractured Tuff. Part 1. Simulation Studies With Explicit Consideration of Fracture Effects, Water Resour. Res., 26(6), 1235-1248, 1990.

Pruess, K. The TOUGH Codes-A Family of Simulation Tools for Multiphase Flow and Transport Processes in Permeable Media, Vadose Zone J., 3,738-746,2004.