

# Chemical Engineering Seminars – HT 2011

## ***Special Seminar***

*Week 7, Friday March 4<sup>th</sup> 2011, 2:00PM-3:00PM*

*Lecture Room 2, Thom Building, Engineering Science*

## **Air Capture & Carbon Management**

Klaus Lackner

Columbia University

### ***Abstract***

Carbon capture and storage technologies allow continued access to abundant fossil fuels while reducing greenhouse gasses. Among all options for carbon capture, capturing carbon dioxide directly from the air is particularly attractive, as it could abate emission sources including small and distributed sources like airplanes and cars for which capture at the source is impractical. In addition, air capture can reduce the concentration of carbon dioxide in the atmosphere, not only stabilizing it, but potentially reducing it if needed. Once collected, carbon dioxide can either be recycled into a new carbon-based fuel creating a closed loop carbon cycle or disposed of safely and permanently through underground injection or the production of solid mineral carbonates.

### ***Biography***

Klaus Lackner is the Ewing Worzel Professor of Geophysics at Columbia University, where he is also the Director of the Lenfest Center for Sustainable Energy, the Chair of the Department of Earth and Environmental Engineering, and a member of the Earth Institute faculty. Lackner's current research interests include carbon capture and sequestration, air capture, energy systems and scaling properties (including synthetic fuels and wind energy), energy and environmental policy, lifecycle analysis, and zero emission modeling for coal and cement plants.

Lackner's scientific career started in the phenomenology of weakly interacting particles. While searching for quarks, he and George Zweig developed the chemistry of atoms with fractional nuclear charge. He participated in matter searches for particles with a non-integer charge in an experiment conducted at Stanford by Martin Perl and his group. After joining Los Alamos National Laboratory (LANL) in 1983, Lackner became involved in hydrodynamic work and fusion-related research. He was a scientist in the Theoretical Division, but also an active part of the Laboratory's upper management. He was instrumental in forming the Zero Emission Coal Alliance and was a lead author in the IPCC Report on Carbon Capture and Storage. In 2001, Lackner joined Columbia University and, in 2004, became a member of Global Research Technologies, LLC.

Lackner earned his degrees from Heidelberg University, Germany: the Vordiplom, (equivalent to a B.S.) in 1975; the Diplom (or M.S.) in 1976; and his Ph.D. in theoretical particle physics, summa cum laude, in 1978. He was awarded the Clemm-Haas Prize for his outstanding Ph.D. thesis at Heidelberg University. Lackner held postdoctoral positions at the California Institute of Technology and the Stanford Linear Accelerator Center before beginning his professional career, and he attended Cold Spring Harbor Summer School for Computational Neuroscience in 1985. Lackner was also awarded the Weapons Recognition of Excellence Award in 1991 and the National Laboratory Consortium Award for Technology in 2001.