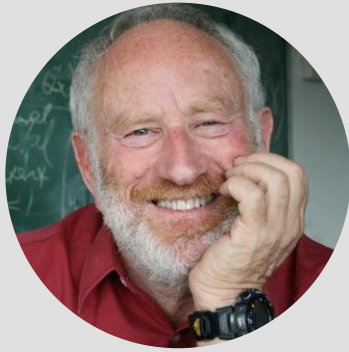


MECHANICAL ENGINEERING SEMINAR



**HERBERT E.
HUPPERT**
DISTINGUISHED
VISITING FACULTY,
MECHANICAL
ENGINEERING (IIT
KANPUR) AND
CHEMICAL
ENGINEERING (IIT
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CHEMICAL GARDENS; THE ORIGIN OF LIFE?

ABSTRACT

Chemical gardens are a plant-like form, derived by placing a compressed amount of a chemical such as cobalt chloride in an aqueous solution such as sodium silicate, but many other combinations are possible. We will describe quantitatively how the cobalt chloride dissolved slowly into the sodium nitrate, with the cobalt chloride reacting with the silicate ions to form semi-permeable precipitates, which grow into a chemical structure with visual symmetry to a variety of biological forms, such as plants fungi, and insects. Similar forms have been found near deep sea vents, discharging hot plumes of chemicals from deep within the earth. Because of the similar features to living organisms there and the absence of both oxygen and sunlight, it had been suggested that this could be where life started.

ABOUT THE SPEAKER

Born in Australia, Herbert graduated from Sydney University before going to ANU in Canberra and then UCSD in California to complete his formal education. From there he transferred to Cambridge in 1968 supported by a two-year fellowship. However he has not yet left! He was appointed the first Professor of Theoretical Geophysics and innovated the Institute of Theoretical Geophysics in Cambridge in 1989, having been elected to the Royal Society in 1987. In 2020 he was awarded a Royal Medal as well as being named Scientist of the Year in an Open International Competition in the category of Earth and related Environmental Sciences. In 2024 he was the recipient of a Global Australian Award. He is keenly interested in fluid mechanics and environmental fluid mechanics in particular. He initiated with Sir Steve Sparks the subject of Geological Fluid Mechanics and has published in a number of areas, including: double-diffusive convection; solidification and melting; gravity current flows, at both low and high Reynolds number; carbon dioxide sequestration; formation of ice in the Arctic and Antarctic; turbidites and pyroclastic flows; flow of granular materials; volcanic eruption dynamics; flows through coral reefs; and defense against tsunamis. He has authored many highly cited papers across these domains.

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