

## Title **Darwin's Invertebrates: A Transient Microbial Oasis**

Speaker Prof. Harold L. Drake  
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Date & Time Friday, November 13, 2015 4:00 p.m.

Place I<sup>2</sup>CNER Hall, Ito campus, Kyushu University

### Abstract

Charles Darwin was fascinated by the capacity of earthworms to alter terrestrial habitats. However, Darwin was not aware that the impact of earthworms is due in part to their effect on the activities of ingested soil microbes during gut passage. Anoxia and worm derived saccharides in the alimentary canal induce 'explosive' levels of fermentations and denitrification, leading to the in vivo emission of molecular hydrogen and the greenhouse gas nitrous oxide, respectively, by the earthworm. The complex fermentation-driven food web includes diverse facultative aerobes and obligate anaerobes. Certain earthworms also emit the greenhouse gas methane. Hydrogen-producing fermentations in the gut drive methanogenesis, and Methanobacteriaceae and Methanoregulaceae are linked to the production of methane. Acetogens may also participate in the flow of carbon and energy in the gut. These collective findings illustrate that the alimentary canal of the earthworm (a) constitutes a mobile and dynamic anoxic micro-compartment that has novel impact on the soil microbiome and (b) augments the production of greenhouse gases and the cycling of elements in the terrestrial biosphere. Functional parallels to peatlands and other greenhouse-gas-emitting ecosystems will be presented.

### About the Speaker

Prof. H. L. Drake is Chair of the Department of Ecological Microbiology at the University of Bayreuth in Germany and is Editor-in-Chief of the journal Applied and Environmental Microbiology. His work is focused on (a) the physiology and ecology of anaerobes, (b) invertebrate microbiology, and (c) the intermediary ecosystem metabolism of environments (e.g., peatlands) that emit the greenhouse gases methane and nitrous oxide.

Host: Associate Professor Ki-Seok Yoon

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