



IP Controlling Chemicals' Fate Lecture



Dr. Ralf Möller

German Aerospace Center (DLR), Cologne, Germany

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Leipziger KUBUS, Lecture Hall 1A

Permoserstr. 15, 04318 Leipzig

Space microbiology: fascination and responsibility

Mars and Jupiter's moon Europa are considered key targets for the search for life beyond Earth. By analogy with terrestrial extremophilic microbial communities additional potential extraterrestrial habitats may be identified. Field studies with microbial communities in those extreme environments as well as microbiological studies in simulated planetary environments will provide valuable information for preparing the "search-for-life" experiments on missions to those solar system bodies.

Microbiologists are also involved in the planetary protection initiative. Robotic orbiters, entry probes, or landers can unintentionally introduce terrestrial microorganisms to a planetary target. This may destroy the opportunity to examine these bodies in their pristine condition. The success of the required cleaning and/or sterilization measures needs to be controlled by establishing a thorough inventory of the bioload prior to launch. Guidelines for bioload measurements, sterilization procedures, and effective planetary protection protocols must be established and implemented.

The presence of humans on the surface of the Moon or Mars will substantially increase the capabilities of space research and exploration; however, the critical microbial issues concerning human health and wellbeing need to be addressed. Also the need to understand evolutionary pressures exerted on microorganisms by the spaceflight environment represent additional upcoming paramount tasks for microbiologists.

In my talk, I will present data and information on previous, ongoing and future space microbiology/astrobiology activities of the DLR.

Dr. Ralf Moeller holds a diploma degree in Biology (Microbiology) from the Technical University of Braunschweig (Germany). He did his PhD at the German Collection of Microorganisms and Cell Cultures GmbH (DSMZ). Thereafter, he worked as a Postdoctoral Research Fellow at the NASA Kennedy Space Center (Space Life Sciences Lab), University of Florida (Gainesville, FL), and National Institute of Radiological Science (Chiba/Tokyo, Japan). Since 2015 he is head of the DLR's Space Microbiology Research Group. The research of his group is the study of the response of various bacterial and fungal species to space conditions, biofilm formation, antibiotic resistance, and evaluation of antimicrobial materials for human and robotic spaceflight missions.

All interested colleagues are kindly invited.