

Postdoctoral Position in Mars Astrobiology

Use of Stable Isotopes to Characterize Metabolic Activity in Hypobarophilic Bacteria Growing at 7 mbar

Location: Space Life Sciences Lab, adjacent to the Kennedy Space Center, FL

Start: Fall 2017

Duration: Annually funded for up to 3 years

Human missions to Mars are now under active planning by NASA and diverse industrial partners. In order to develop hardware, spacesuits, and habitats that meet mission objectives while also preventing forward contamination of Mars; the survival, metabolism, and growth of terrestrial microorganisms under Mars surface conditions must be characterized. Recently, 29 bacterial species were identified that grew under simulated Martian conditions near 7 mbar and 0 C (henceforth called hypobarophiles) (e.g., Schuerger et al. 2013, *Astrobiology*, 13(2), 115-131; Schuerger and Nicholson, 2016, *Astrobiology*, 16(12), 964-976). However, these experiments were restricted to mostly non-spacecraft microorganisms from arctic and alpine extreme environments, and thus, key planetary protection questions persist for developing successful robotic and crewed exploration missions to Mars. For example, (1) Are hypobarophilic microorganisms present on actual planetary spacecraft scheduled for Mars landings? (2) What are the ratios of culturable to nonculturable hypobarophilic species on planetary spacecraft, or in other oligotrophic extreme environments? And (3), what are the low-temperature, low-pressure, and high-salt tolerance levels for maintenance metabolism and growth of hypobarophilic species under Martian conditions (e.g., in recurring slope lineae, lava tube ice caves, and ground ice)?

The Univ. of Florida is seeking an enthusiastic and capable postdoctoral scientist in Mars Astrobiology to study the growth of hypobarophilic bacteria under simulated Martian conditions. The research will use stable isotope probing, fluorescent stains, and NanoSIMS to explore the lower limits of metabolism and growth for hypobarophilic bacteria under simulated Mars surface conditions of 7 mbar, 0 to -30 C, CO₂-enriched anoxic atmospheres, and high salts concentrations. The successful candidate will have a PHD and experience in microbial ecology, metabolism, and bioinformatics of psychrophilic or other extremophilic bacteria. In addition, experience in the use of stable isotopes, electron microscopy (SEM & TEM), or epifluorescent microscopy are desired.

A competitive salary (\$50,000) and benefits package will be offered based on work experience and demonstrated writing skills. Interviews will begin on Sept. 11, 2017, and the position filled as soon as possible thereafter (Oct. 1st to no later than Dec. 31, 2017).

Please submit a letter of interest, CV, official grades, and three letters of reference to:

Dr. Andrew C. Schuerger, Dept. of Plant Pathology, University of Florida, 505 Odyssey Way, Merritt Island, FL 32953. E-mail: schuerg@ufl.edu. If by email (preferred), please use the subject heading: Mars Astrobiology Post-Doc, plus the last name of the applicant.

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