

Postdoc Position in Single-Cell Microbial Ecology

Division of Microbial Ecology (www.microbial-ecology.net)
Department of Microbiology and Ecosystem Science
University of Vienna

A postdoc position is available as part of a US-DOE funded collaborative project with the theme:

“Exploring spatial patterns of microbial activity and interactions using Raman microspectroscopy”

The interactions between bacteria can have significant and wide-ranging effects on diverse ecosystems, yet our ability to directly and non-destructively observe these interactions in a dynamic manner is limited. Existing experimental systems do not capture the physical and chemical complexity inherent in natural systems. This project integrates microfluidics, Raman microspectroscopy, and isotopic labeling to enable the real-time, dynamic visualization of microbial interactions.

Raman microspectroscopy is a powerful technique for the analysis of microbial cells at the single cell level. A single Raman spectrum of a microbial cell can be acquired within seconds and yields data about its abundant chemical bonds, such as those derived from nucleic acids, proteins, lipids, and carbohydrates. Raman spectra provide chemical fingerprints that are highly sensitive to the cellular biochemical composition and physiological state of the cell. Raman also allows substrate utilization to be monitored: by providing ^{13}C labelled variants of compounds of interest, assimilation of ^{13}C into cellular biomass can be detected by distinctive shifts in peaks in the Raman spectrum. Raman microspectroscopy is non-destructive, and the activity of organisms can be monitored over time without affecting their physiology.

In this project, a novel microcosm-imaging platform will be established and used to visualize interactions in realistic, heterogeneous, three-dimensional environments. This will serve as a robust system to manipulate, perturb, and observe microbial activity *in situ* that is also flexible enough for diverse applications by the broader scientific community. This approach will improve our understanding of how complex microbial communities are generated, maintained, process carbon, and may be usefully manipulated.

Required and preferred qualifications. We are looking for a highly motivated and independent scientist interested in microbial ecology and development of novel methods. Applicants should have a strong background in environmental microbiology, Raman microspectroscopy, or microfluidics. Experience in one or more of the following areas/techniques is advantageous: isotope analytics, fluorescence microscopy, intestinal microbiology, and cultivation of anaerobic microorganisms. Proficiency in spoken and written English is mandatory.

Conditions of appointment. We offer up to 1.5 years of appointment according to the salary scheme of the University of Vienna. The University of Vienna is an equal opportunity employer.

Mode of application. To apply, please **send an email** to David Berry, berry@microbial-ecology.net containing a **single pdf-file** with a **short letter of motivation**, a **detailed CV** (including a brief description of research interests, previous employments, and publication list), **reprints of your two most important published articles**, and **contact details of at least two references** (letters of recommendation are optional).

Application deadline is continuous until positions have been filled.

Job start is flexible, with an option to start immediately.