

PROJECT SUMMARY

Over the last two years, the NSF-supported Red Layer Microbial Observatory (RLMO) project, lead by Dr. Sarah Boomer (Western Oregon University, WOU), has described and compared nearly 150 new bacterial DNA sequences (16S ribosomal genes) from ten hot spring communities in Yellowstone National Park and Eastern Oregon. Most represent novel "red" green nonsulfur (GNS) phototrophs, an evolutionarily ancient group of diverse bacteria. Site-specific clustering among red GNS isolates suggests that as-yet-unknown, variable site feature(s) may drive selection of red GNS variants. This RLMO project renewal will assess RLMO population diversity (with an emphasis on red GNS diversity) at four established Yellowstone RLMO over four years. Integral methods to be employed for these studies include denaturing gradient gel electrophoresis (DGGE) and in situ PCR, both new to WOU's undergraduate research program. This project will further assess RLMO chemistry using a broad battery of spectrophotometric tests (also new to the WOU program), the goal being to analyze GNS diversity as a function of site geochemistry, both of which are hypothesized to change over time. All studies will be performed by undergraduates in the context of new, improved research-driven coursework in Molecular Biology, Microbiology, and field-based Molecular Microbial Ecology (estimated impact = 80-100 undergraduates per year). The addition of a full-time education coordinator to this project will facilitate improved education outreach, establishing a series of on-campus RLMO-based workshops for both pre-college secondary students and secondary science teachers (estimated impact = 100-150 individuals per year). Ongoing affiliations with WOU's education majors and Upward Bound, and a growing network with local educators will be well-served by these program improvements.