

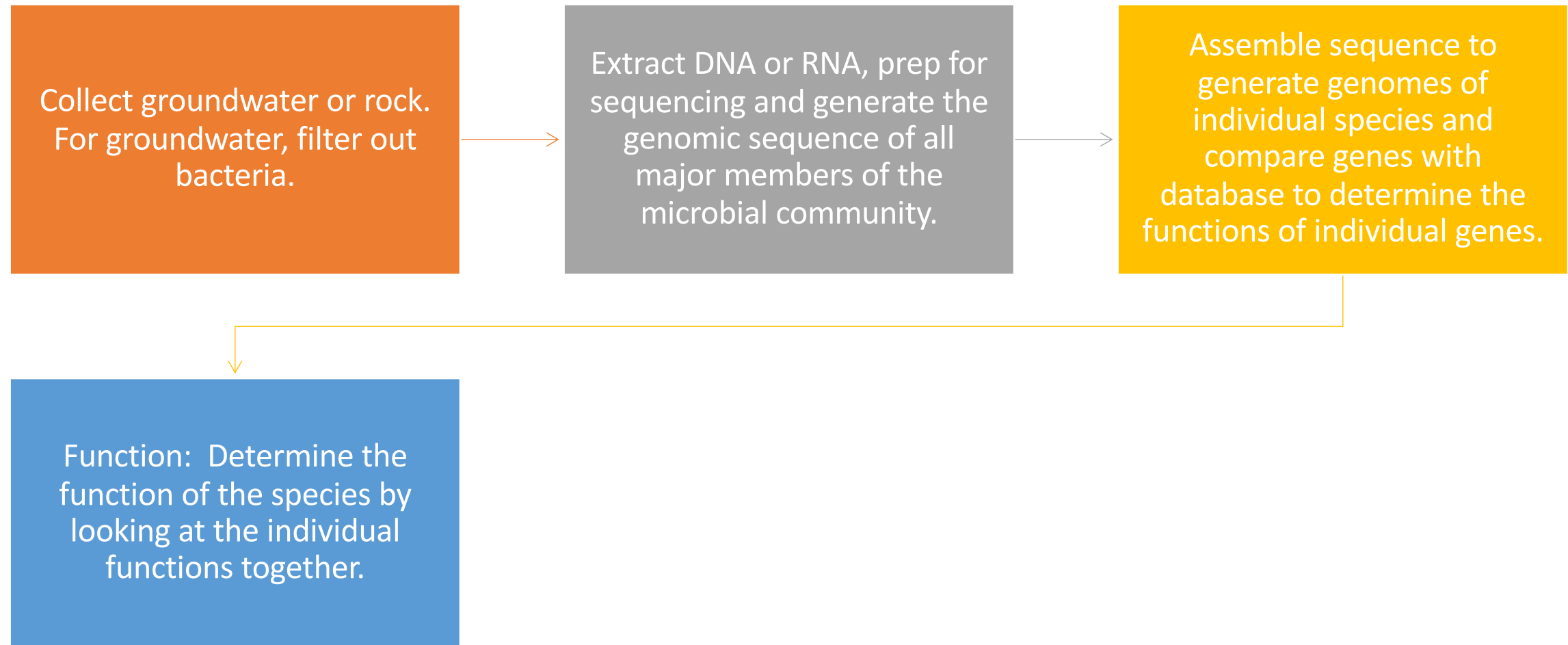


Underground Facilities Biology

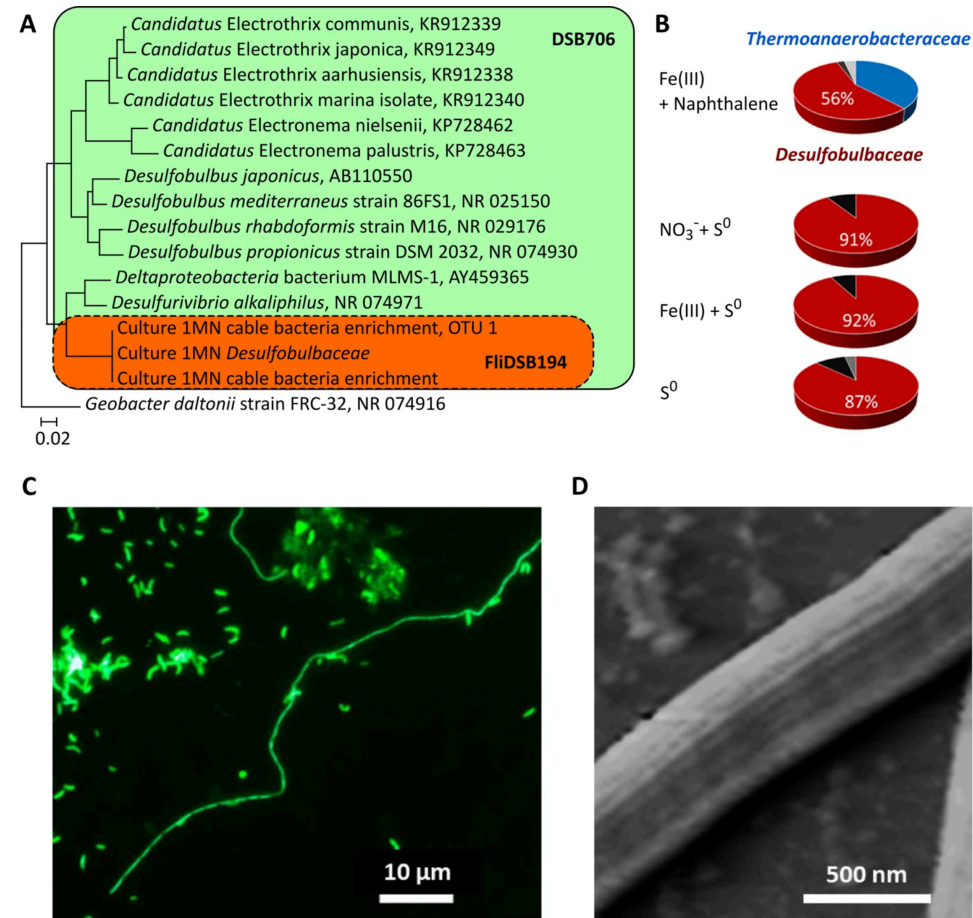
Lee Krumholz

University of Oklahoma

General procedure- Metagenomic Studies



Cable bacteria-Muller et al., 2020. Nature.



Novel Methane and short chain alkane using bacteria. Borrel et al., 2019. Nature Microbiology






Fig. 2 | Phylogeny of the MCR/MCR-like complex and conservation of important positions in the catalytic site. a, Unrooted Bayesian phylogeny (CAT+GTR+I⁴) based on a concatenation of McrABG/McrABG-like subunits (1,187 amino acid positions) from 109 genomes/MAGs (see Supplementary Table 6 for details). Node supports refer to posterior probabilities and for reasons of readability only values above 0.8 are shown. The scale bar represents the average number of substitutions per site, 0.1. The colour code is similar to that in Fig. 1 with the exception of NM1 that have both an MCR-like (in blue)

Shows that ancient microbial communities can persist in isolated subseafloor sediments.

Article | [Open Access](#) | [Published: 28 July 2020](#)

Aerobic microbial life persists in oxic marine sediment as old as 101.5 million years

[Yuki Morono](#) , [Motoo Ito](#), [Tatsuhiko Hoshino](#), [Takeshi Terada](#), [Tomoyuki Hori](#), [Minoru Ikehara](#), [Steven D'Hondt](#)  & [Fumio Inagaki](#) 

[Nature Communications](#) **11**, Article number: 3626 (2020) | [Cite this article](#)

41k Accesses | **2073** Altmetric | [Metrics](#)

Chivian et al. 2008. South African gold mine.

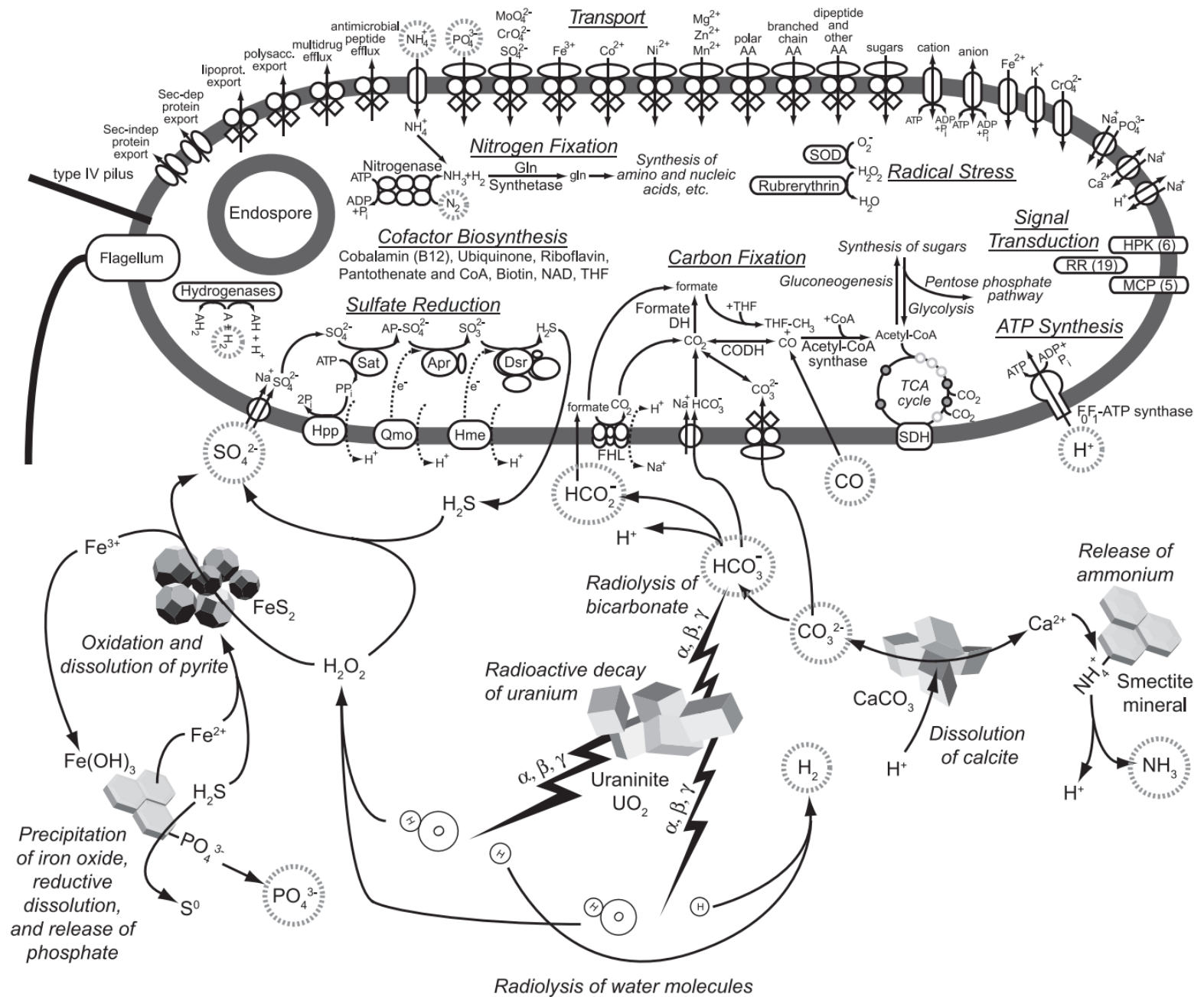


Fig. 3. Model of the single-species ecosystem at MP104. *D. audaxviator*'s machinery is shown in a cartoon representation, including pathways for sulfate reduction, nitrogen fixation, and carbon fixation. Signal transduction proteins are reported including the number found in parentheses, with MCP indicating methyl-accepting

chemotaxis proteins; HPK, histidine protein kinases; and RR, response regulators. Transporters include approximate substrates. Also shown are the radiolytically generated sources of energy and nutrients for the ecosystem, as detailed in Lin *et al.* (11), shown experimentally by Lefticariu *et al.* (28), and described in (16).

The genome of a subterrestrial nematode reveals an evolutionary strategy for adaptation to heat

Deborah J. Weinstein, Sarah E. Allen, Maggie C.Y. Lau, Mariana Erasmus, Kathryn C. Asalone, Kathryn Walters-Conte, Gintaras Deikus, Robert Sebra, Gaetan Borgonie, Esta van Heerden, Tullis C. Onstott,  John R. Bracht

doi: <https://doi.org/10.1101/747584>

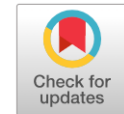
This article is a preprint and has not been certified by peer review [what does this mean?].

TC Onstott and
Thomas Kieft

- Beatrix Gold Mine in South Africa at 1.3km below the surface
- 2.9 - 3.1 km deep, Archean-aged units of the Moab Khotsong gold mine in South Africa.

ORIGINAL RESEARCH ARTICLE

Front. Earth Sci., 31 July 2019 | <https://doi.org/10.3389/feart.2019.00196>



Establishment of the Deep Mine Microbial Observatory (DeMMO), South Dakota, USA, a Geochemically Stable Portal Into the Deep Subsurface

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Work by
Maggie
Osburn at
SURF





ORIGINAL ARTICLE |  Full Access |

Mineral-hosted biofilm communities in the continental deep subsurface, Deep Mine Microbial Observatory, SD, USA

Caitlin P. Casar , Brittany R. Kruger, Theodore M. Flynn, Andrew L. Masterson, Lily M. Momper
Magdalena R. Osburn

First published: 26 March 2020 | <https://doi.org/10.1111/gbi.12391>

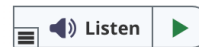
Maggie Osburn

Kidd Creek
Deep Fluid
and Deep
Life
Observatory-
Canada

- Barbara Sherwood-Lollar

Geomicrobiology Journal >

Volume 36, 2019 - Issue 10



Articles

‘Follow the Water’: Hydrogeochemical Constraints on Microbial Investigations 2.4 km Below Surface at the Kidd Creek Deep Fluid and Deep Life Observatory

Garnet S. Lollar , Oliver Warr , Jon Telling , Magdalena R. Osburn  & Barbara Sherwood Lollar  

Pages 859-872 | Received 15 Jan 2019, Accepted 01 Jul 2019, Published online: 18 Jul 2019

ORIGINAL RESEARCH ARTICLE

Front. Microbiol., 12 March 2019 | <https://doi.org/10.3389/fmicb.2019.00426>

An Ionic Limit to Life in the Deep Subsurface

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Barbara Sherwood Lollar- Boulby Mine, United Kingdom
between 800 and 1300 m depth.

Distribution and activity of methanogens and homoacetogens in deep granitic aquifers at Aspo Hard Rock Laboratory, Sweden

June 1998 · FEMS Microbiology Ecology 26(2):121-134

DOI: 10.1016/S0168-6496(98)00028-2

Project: Deep biosphere

Authors:



Svetlana Kotelnikova

19.95 · St. George's University

Aspo Hard Rock Laboratory in Sweden-Karsten Pedersen

Needs

- Novel and Geologically Relevant Geochemical Environments.
 - Ancient sedimentary, igneous and metamorphic rock.
 - More recent systems.
 - Extreme conditions of salinity, pH and potential toxins.
 - Contaminants, Radionuclides.
- Access to groundwater and rock that is not contaminated with surface water due to pumping or cooling.
- Access to the many locations at sites under non-extreme conditions and for extended periods of time to conduct in-situ studies.
- Safety issues dealt with effectively.

