

Microbial Megastructures



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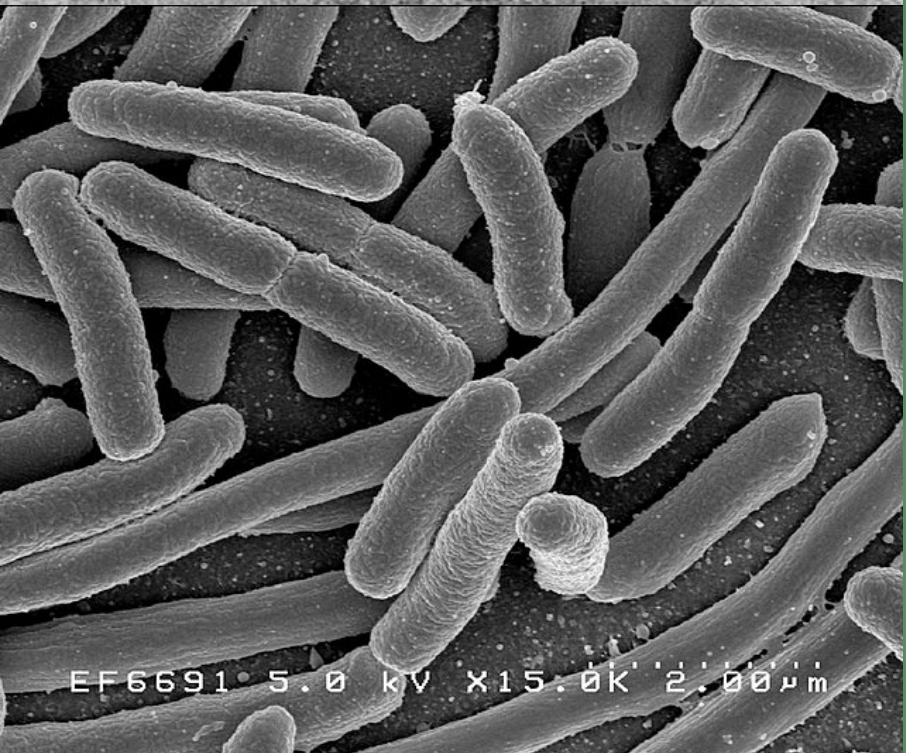
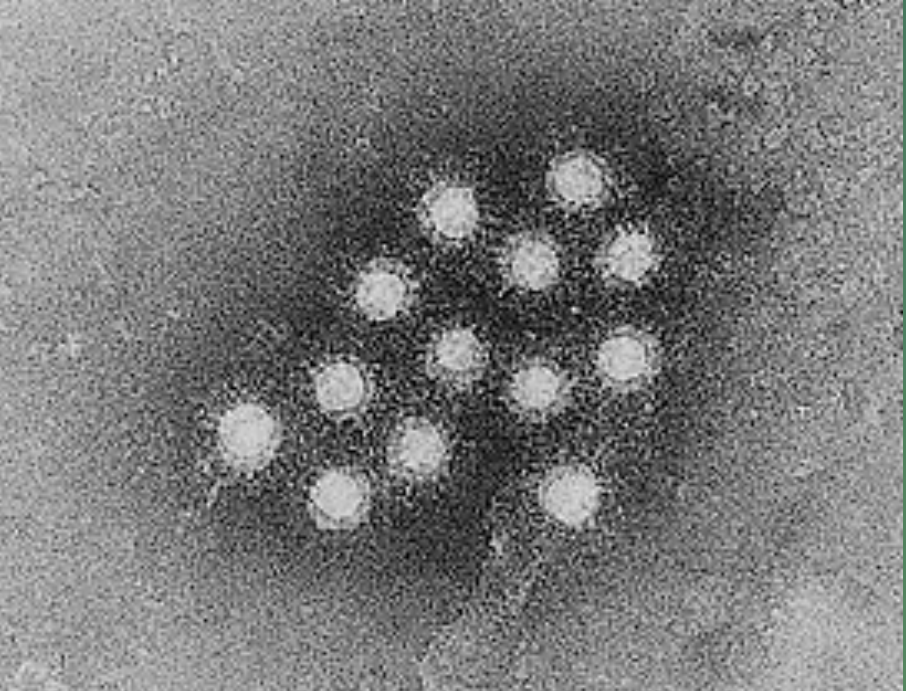


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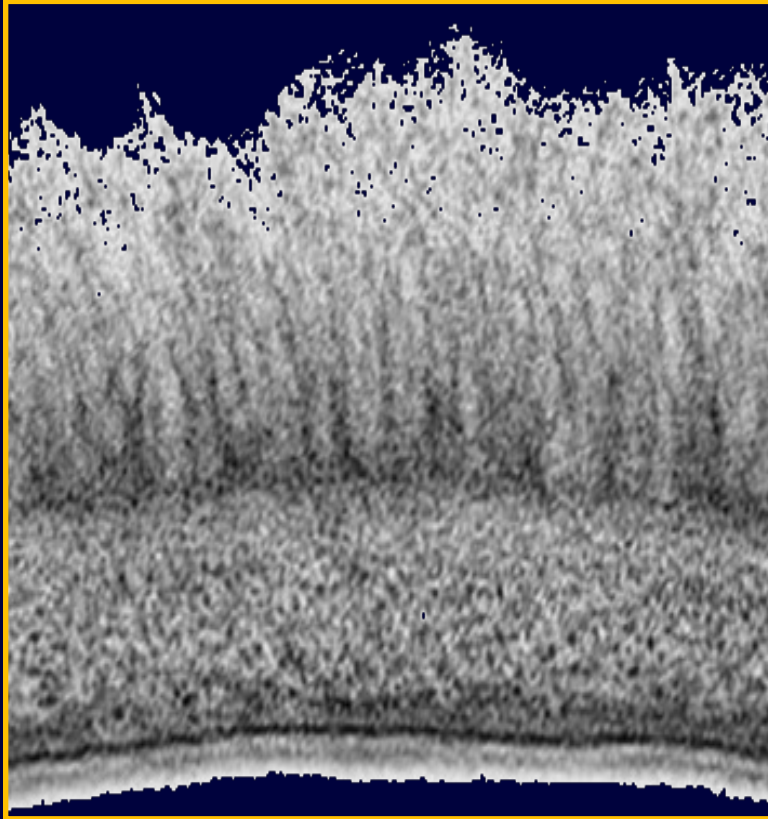
GRESHAM
COLLEGE

Stromatolites...

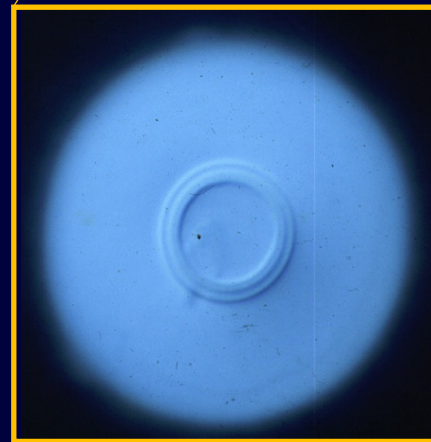
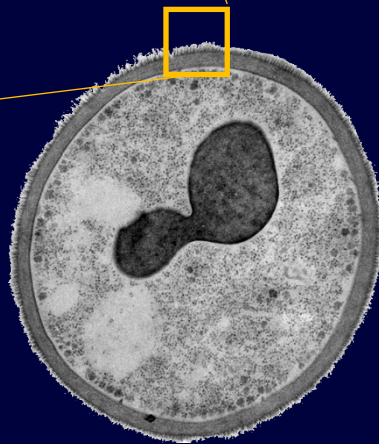
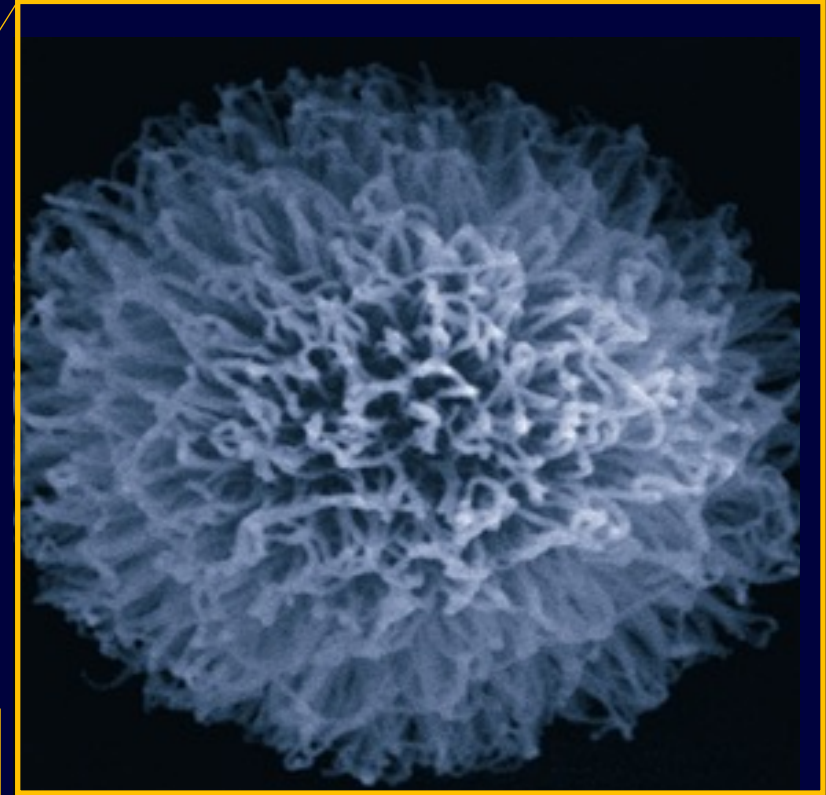




The Microbial Surface is a Microscopic Megastructure



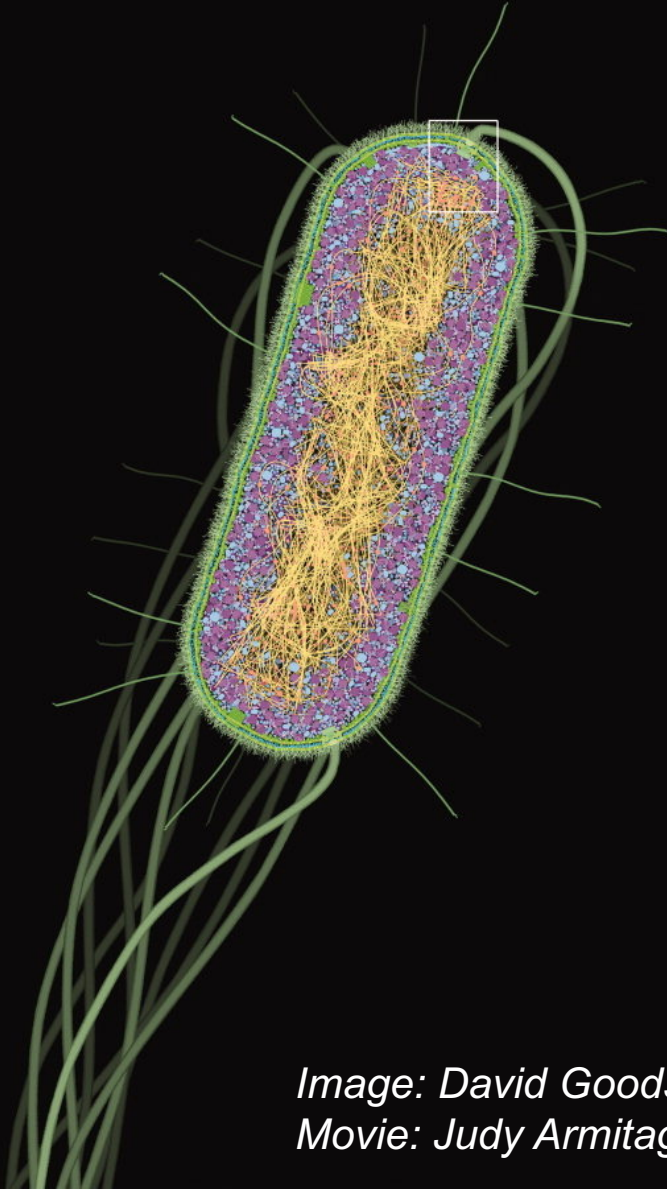
Megastructure



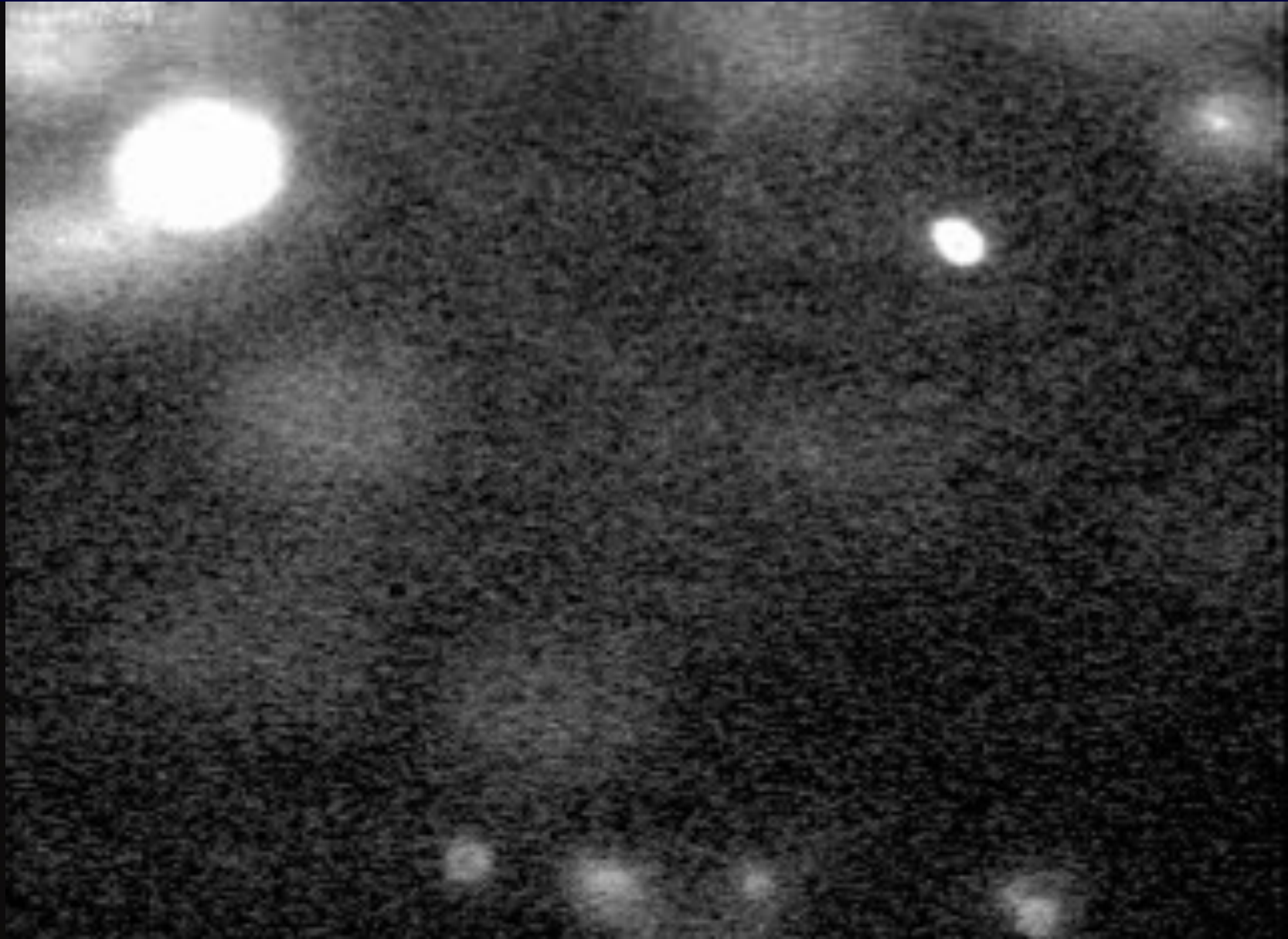
Courtesy of Neil Gow & Arturo Casadevall



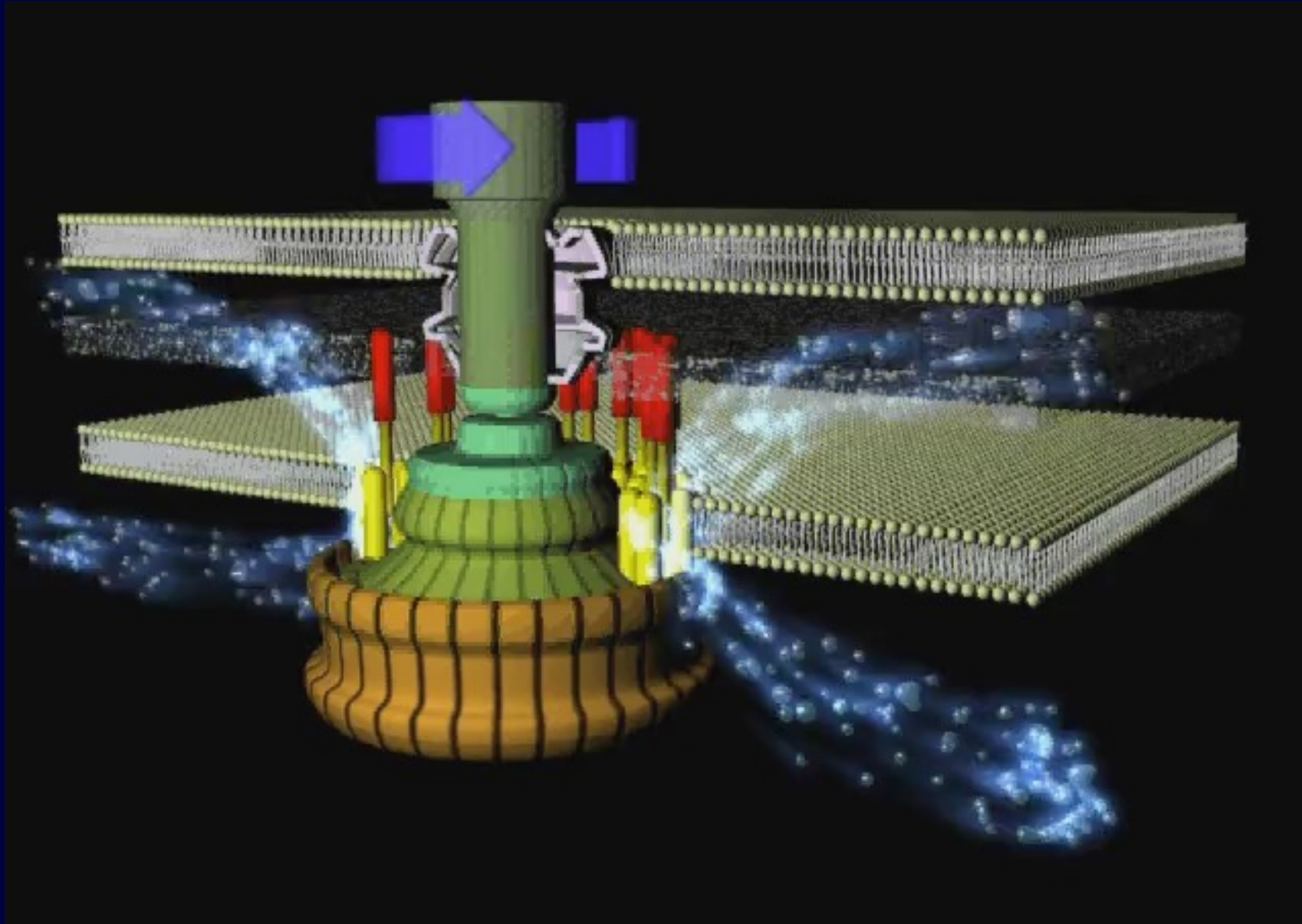
...and so is the Bacterial Flagellum



*Image: David Goodsell
Movie: Judy Armitage*



...and so is the Bacterial Flagellum



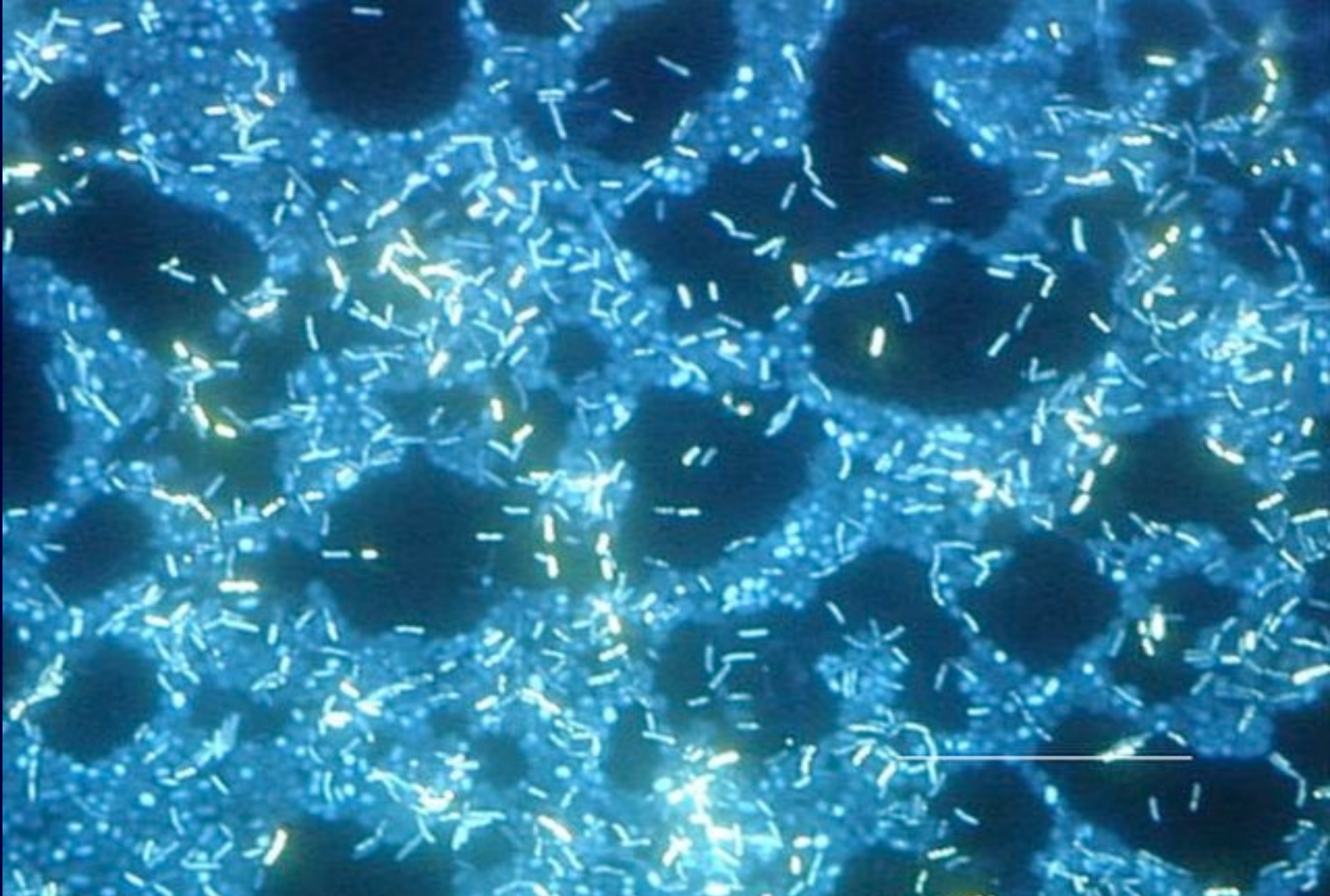
Courtesy Judy
Armitage



When microbes club together, the structures they create can be truly remarkable...

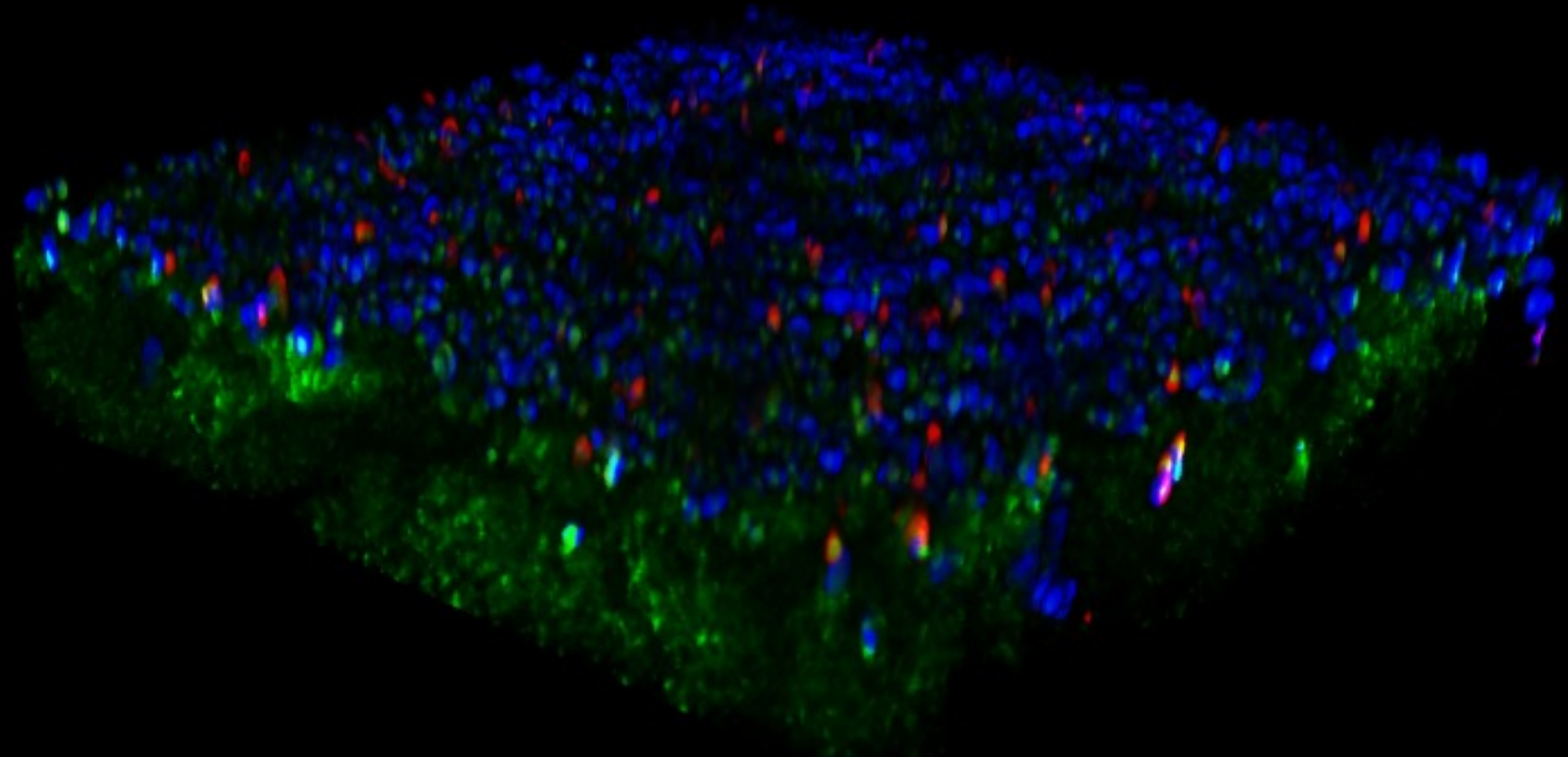


Biofilms





50 μm



A Biofilm Closer to Home...





***Symbiotic structures have shaped the
Earth***





50 μm

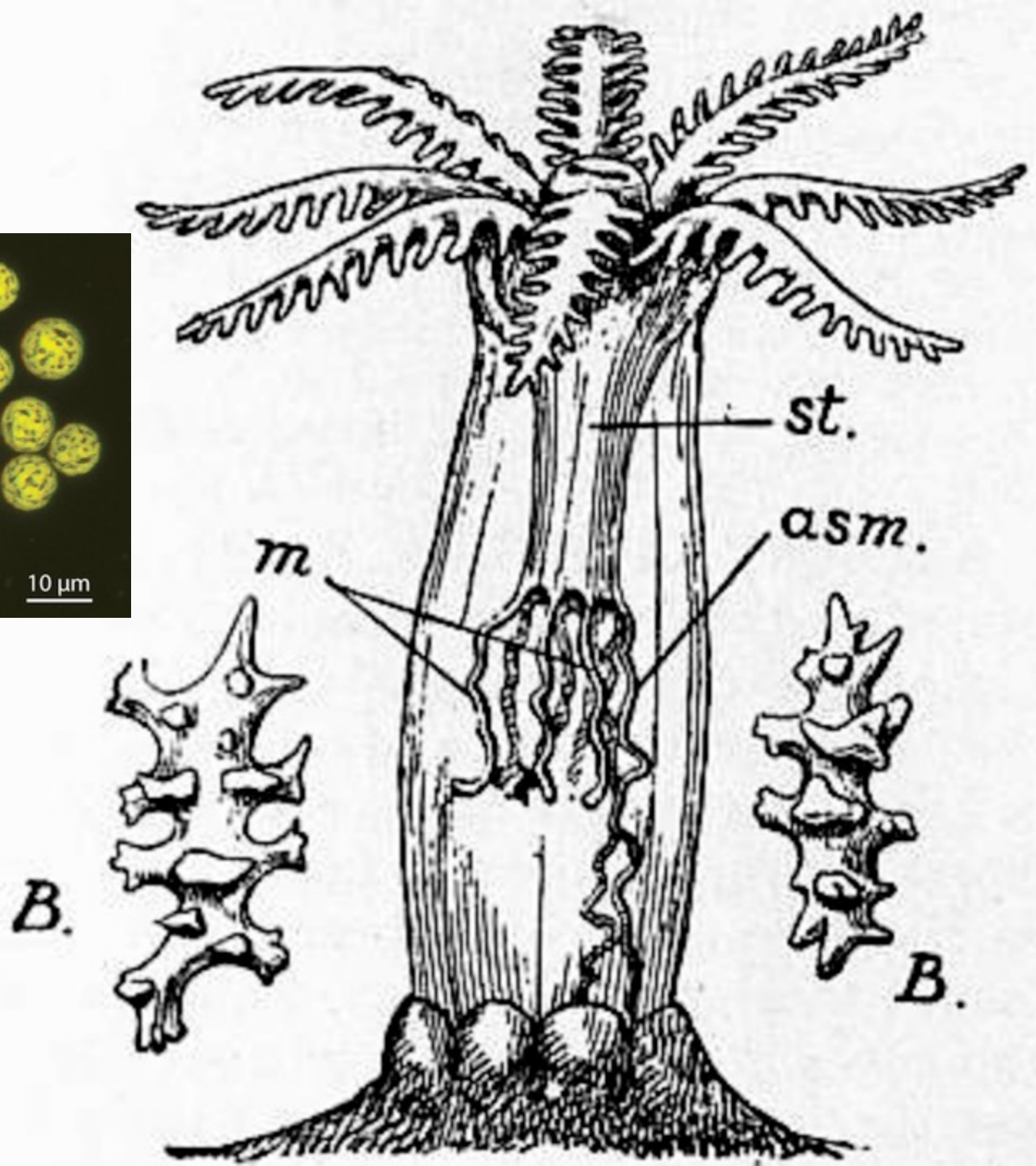
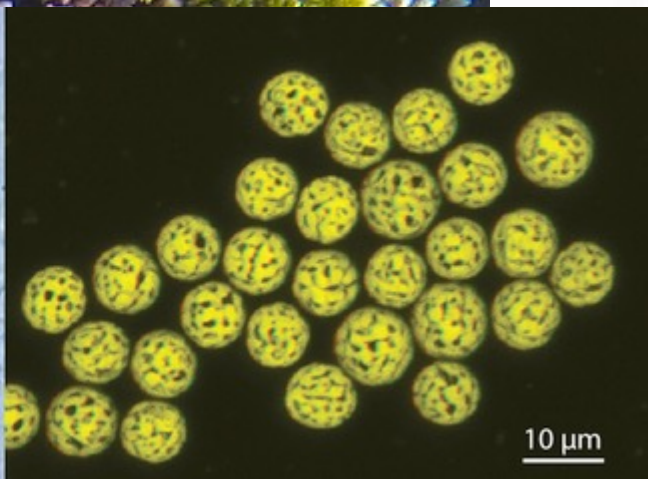
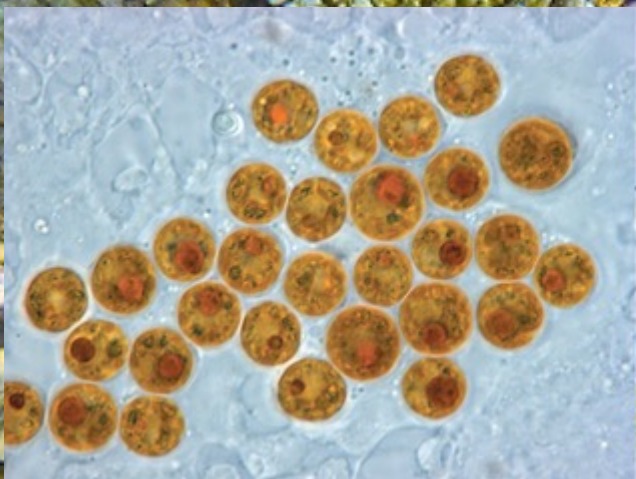
- Mycorrhiza probably facilitated the colonization of land by early plants
- 80-90% of all land plants have them
- Some are critical...



***One of the largest structures on Earth is
(partially) microbial...***











- Many corals also contain **CORALLICOLIDS**

Courtesy of Patrick Keeling



Microbes are essential to many of the most spectacular landscapes in the world





PEAT



Creates an acidic,
anaerobic
environment

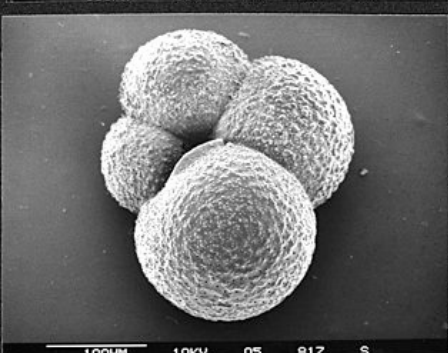
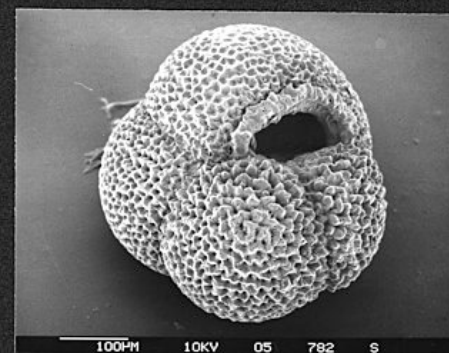
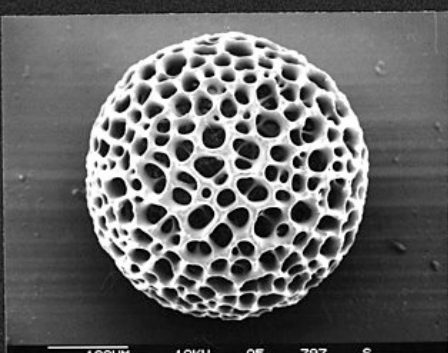
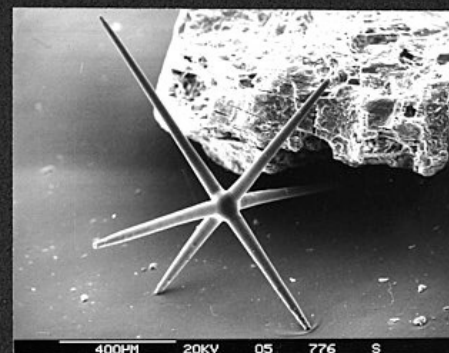
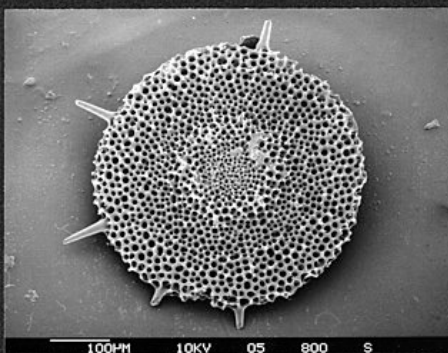
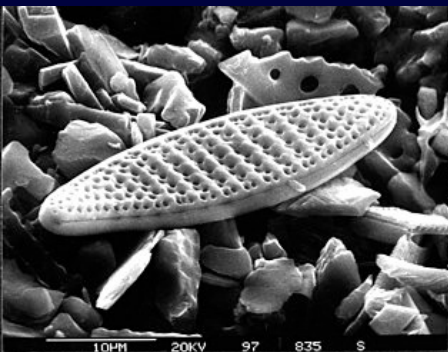
Few other land
plants survive

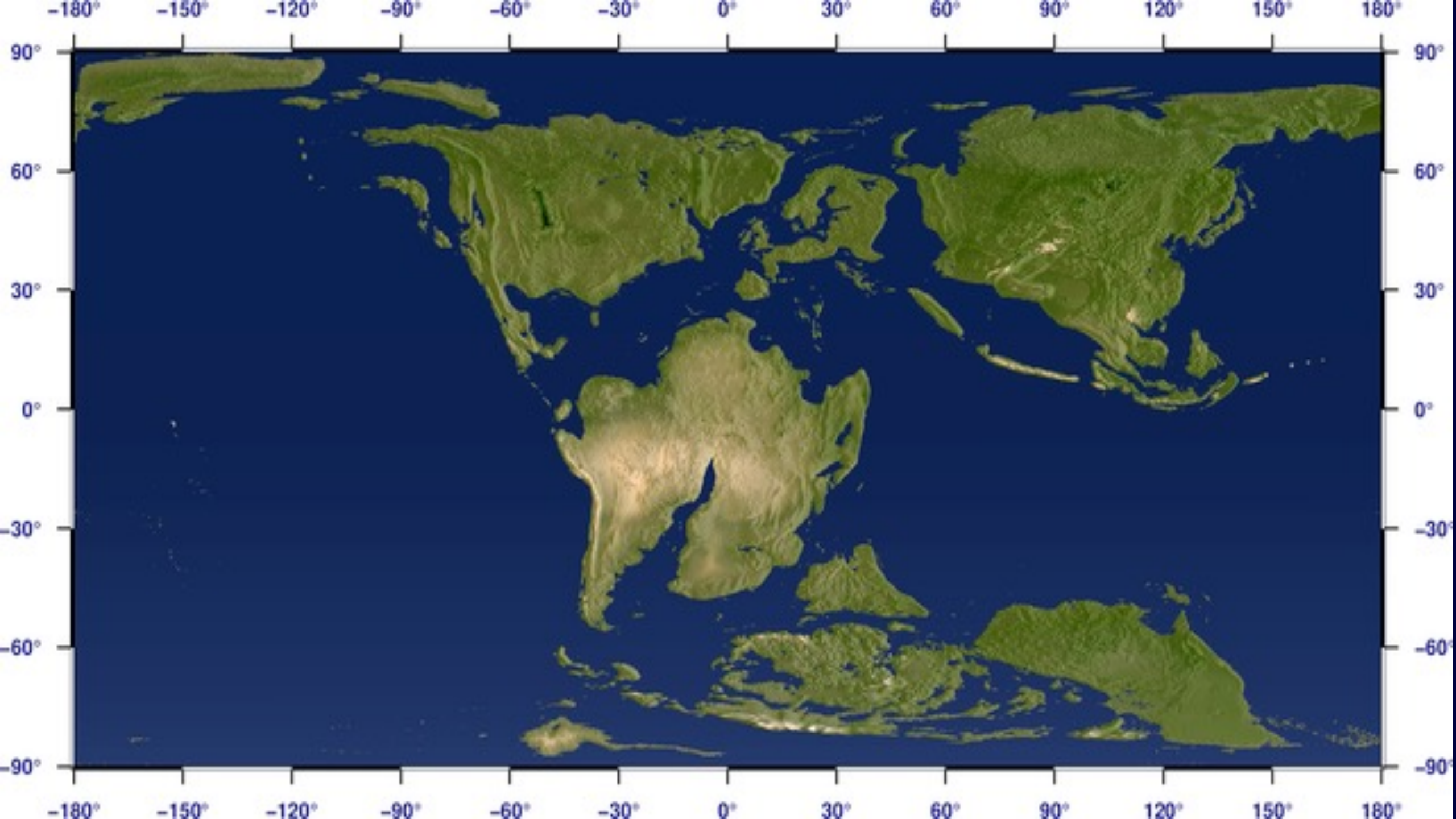
METHANOGENIC
ARCHAEA thrive

METHANOTROPHIC
BACTERIA convert
this to CO₂ and
'feed' the moss





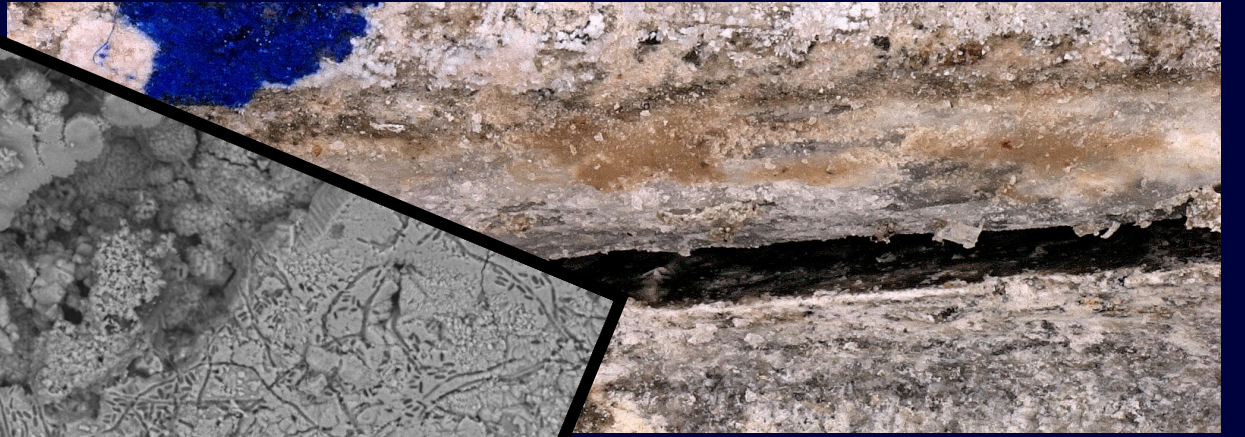
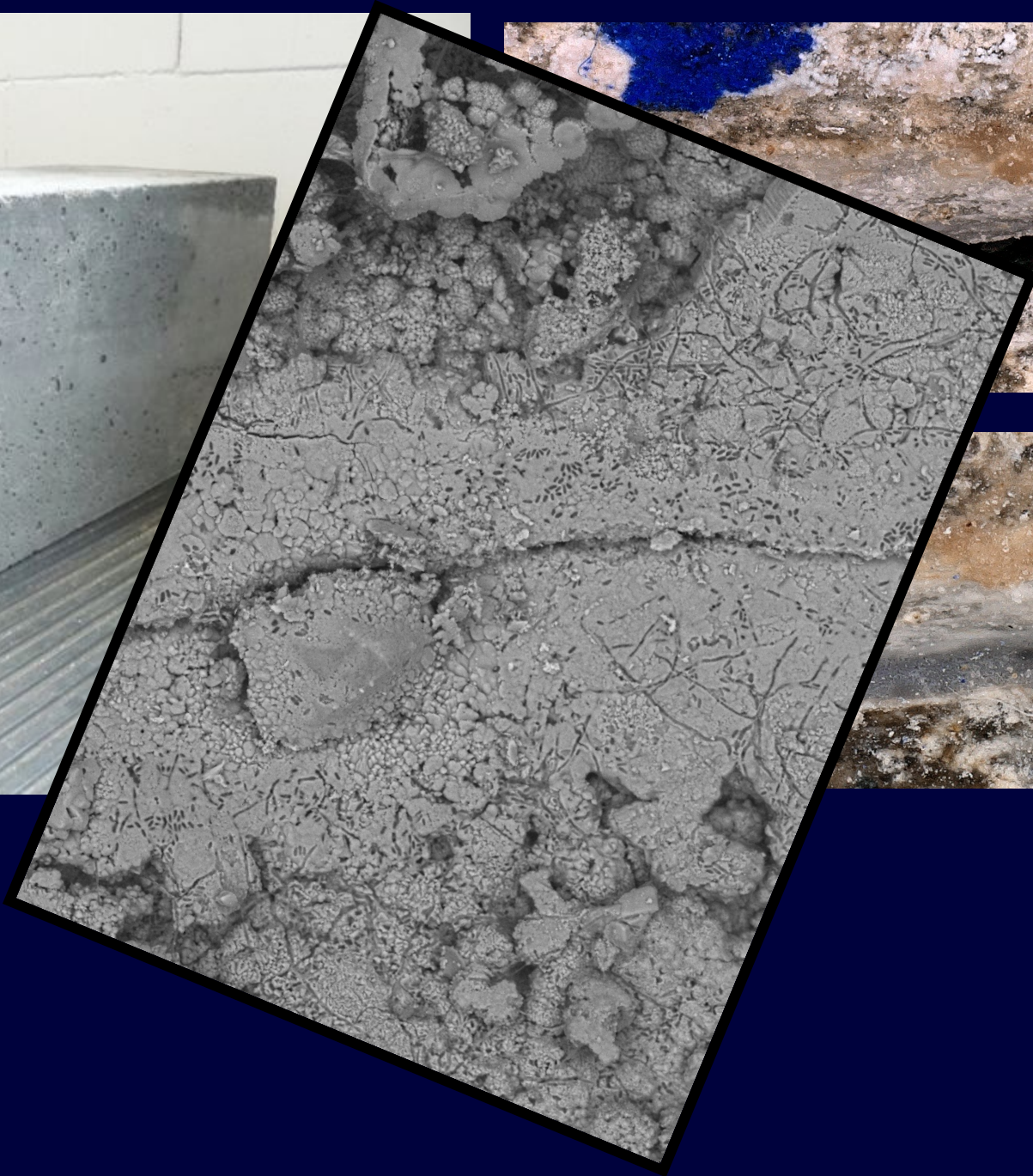






**Finally...can we harness these amazing
microbial construction abilities?**



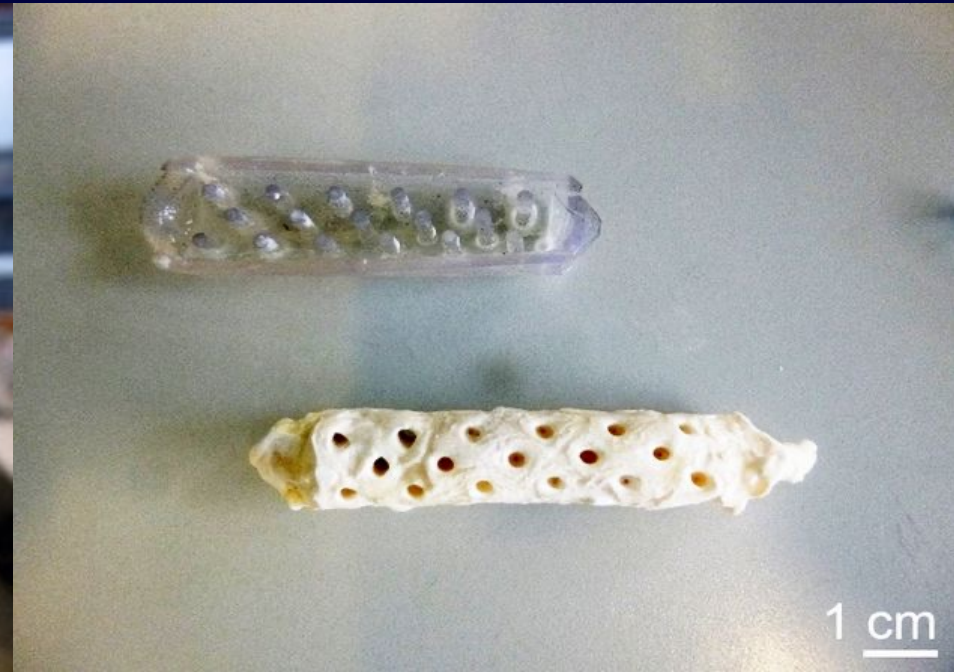
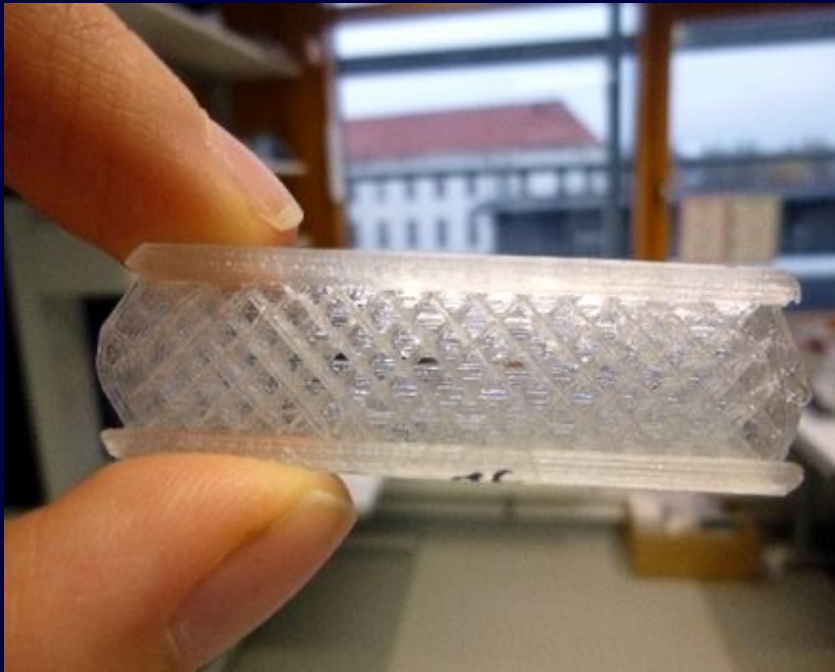


*Courtesy of Kevin Paine &
Susanne Gebhard*





Precision construction by microbial engineers



Courtesy of Daniel van Opdenbosch



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