

Biologically and thermally controlled mineral precipitation and dissolution for well sealing, metal (im)mobilization and other engineering applications



CENTER FOR
BIOFILM
ENGINEERING

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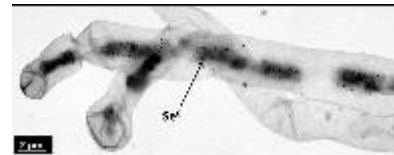
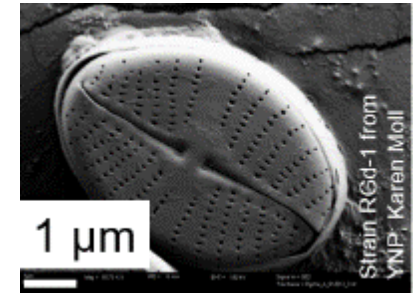
Robin Gerlach has more than 25 years of experience of studying and controlling the interaction of biotic and abiotic processes catalyzed by microbial activities. Dr. Gerlach has developed technologies utilizing microbes and biofilms for the degradation and immobilization of environmental contaminants, in bioenergy and bioproduct generation, carbon sequestration, resource recovery, medical applications and other biotechnologies. Most recently, Dr. Gerlach was part of a team to develop a biocementation technology to commercial application for sealing, difficult to seal, leaky wells in the subsurface to improve the storage security of carbon dioxide and other gases.

Technology or focus area

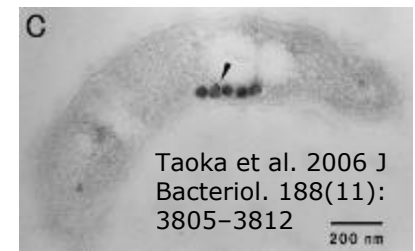
- Microbial Biotechnology and Biofilms
- Mineral dissolution and precipitation
- Enrichment of metals from diffuse sources
- Well Integrity and subsurface storage

Ideas, Interests, Concepts to be Explored

- **Controlled Metal Precipitation and Dissolution**
- In Situ Biomineralization
- In Situ Biofactories
- In Situ Manufacturing
- Well Integrity



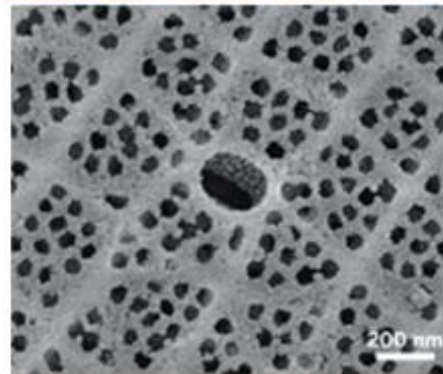
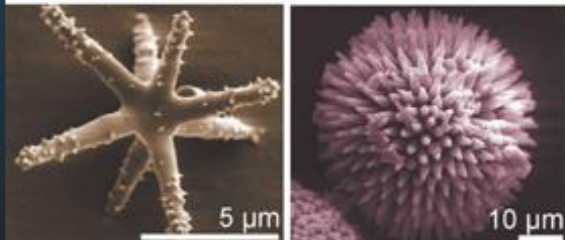
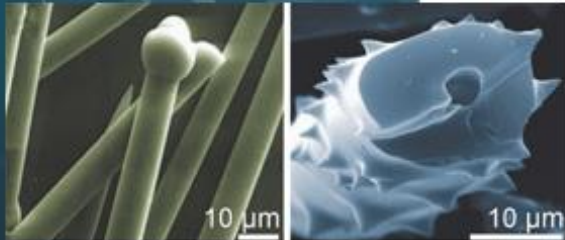
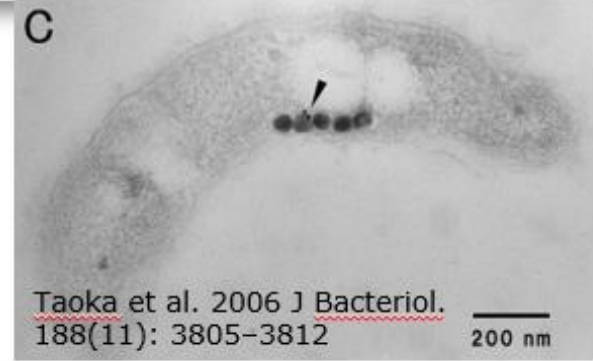
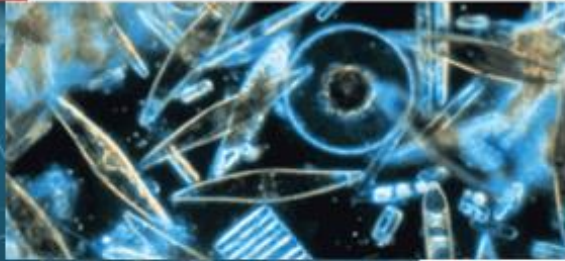
Espinosa-Ortiz et al., 2015, Applied Microbiology & Biotechnology, 99:2405-2418.



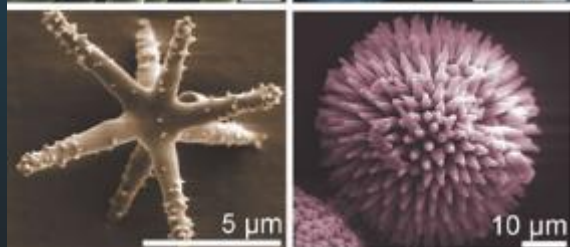
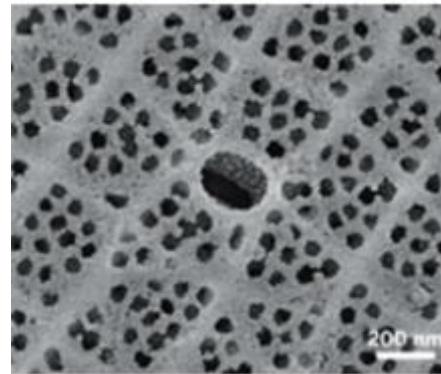
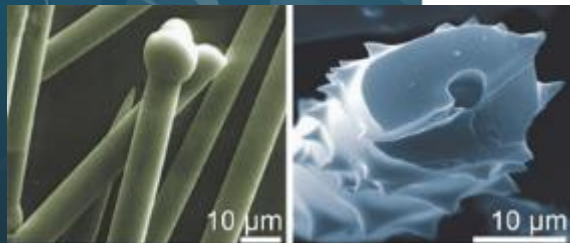
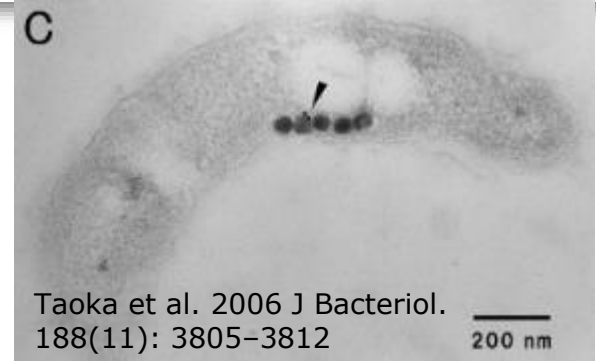
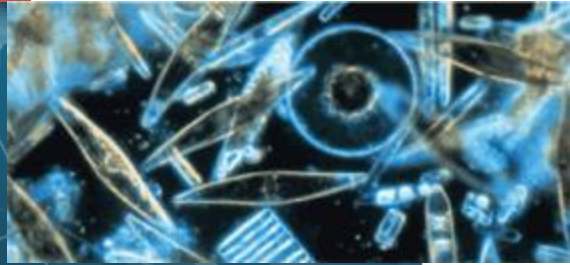
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Engineered Biomineralization - mineral precipitation and dissolution controlled by microbes

Mineral Formation in Nature



Mineral Formation in Nature



C&EN March 12, 2007 Volume 85, Number 11 p. 13
 Chemistry World April 15, 2008. <http://www.rsc.org/chemistryworld/News/2008/April/15040801.asp>
 Bao et al. *Nature* **2007**, 446, 172