



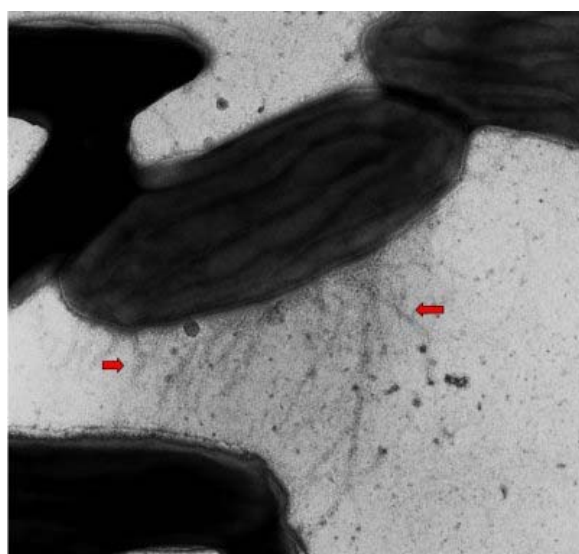
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**JUNE 29, 2005**

## MICROBIAL NANOWIRES

*Unlocking the Code – Science, Systems and Technological Breakthroughs*

*Geobacter* is quite the interesting genus of bacteria. As



extremophiles, they can live quite happily under conditions too toxic for most creatures big or small. Moreover, many *Geobacter* microbes are able to convert those toxins into materials far less dangerous -- a process referred to as "bioremediation" -- sometimes generating electricity in the process.

But in trying to better understand how *Geobacter* is able to do all of this, researchers at the University of Massachusetts at Amherst -- including the original discoverer of the *Geobacter* line -- stumbled across another remarkable characteristic of these creatures: nanowires. *Geobacter* is criss-crossed with tiny (3-5 nanometer wide) protein wires able to conduct electrons out of the cell.

*The remarkable and unexpected discovery of microbial structures comprising microbial nanowires that may enable a microbial community in a contaminated waste site to*

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*form mini-power grids could provide new approaches to using microbes to assist in the remediation of DOE waste sites; to support the operation of mini-environmental sensors, and to nano-manufacture in novel biological ways. This discovery also illustrates the continuing relevance of the physical sciences to today's biological investigations." [...]*

*Ultrafine wires, often referred to as nanowires, are required for further miniaturization of electronic devices. Manufacturing nanowires from more traditional materials such as metals, silica, or carbon is difficult and expensive. However, it is easy to grow billions of Geobacter cells in the laboratory and harvest the microbial nanowires that they produce. Furthermore, by altering the DNA sequence of the genes that encode for microbial nanowires, it may be possible to produce nanowires with different properties and functions.*

*Another interesting implication of this research is that it suggests a mechanism for microbes to share energy in a mini-power grid. The nanowire pili of individual Geobacter often intertwine, suggesting a strategy by which Geobacter might share electricity.*

The article appears in the current *Nature*, and is [available for download](#) (PDF) from the [Geobacter Project](#) website.

The future will be built with the guts of creatures far too small to see.

Posted by Jamais Cascio at June 29, 2005 03:06 PM | [TrackBack](#)

## COMMENTS

Wow. Like, really, wow.

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