

# The Effect of Inoculation Source on the Performance of Microbial Fuel Cells (MFCs) and on the Composition of the Steady State Microbial Community

P.I.s: Dr. Daniel Bond<sup>1,3</sup>, Dr. Ray Hozalski<sup>2</sup>, & Dr. Timothy LaPara<sup>2</sup>

Researchers: Christopher Harrington<sup>2</sup>, Tsutomu Shimotori<sup>2</sup>, Enrico Marsili<sup>1</sup>

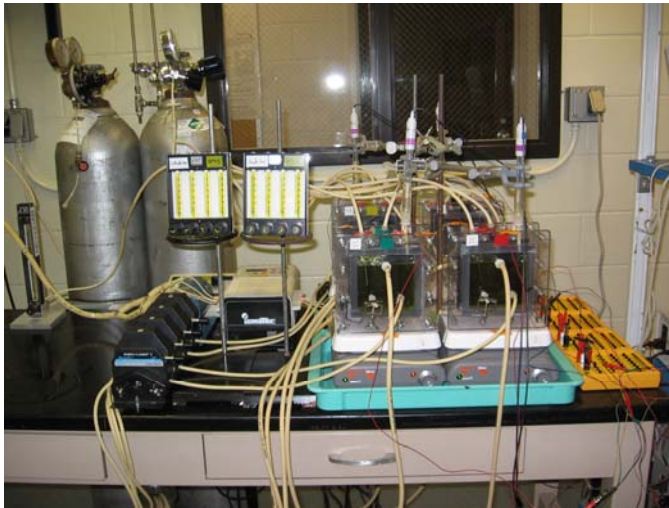
<sup>1</sup>Biotechnology Institute, <sup>3</sup>Department of Microbiology, <sup>2</sup>Department of Civil Engineering, University of Minnesota  
NNIN Facility utilized: Characterization Facility

## DESCRIPTION OF WORK

- ◆ Microbial fuel cells were set up and run for 30 days using three different inoculum.
- ◆ The enriched bacterial community was studied with cyclic voltammetry and differential pulse voltammetry.
- ◆ Microbial fuel cell performance was measured by current and potential development.
- ◆ Depletion of electron donor was measured by high performance liquid chromatography.
- ◆ Scanning electron microscopy was used to visualize the bacteria on the electrode.

## Facility Used

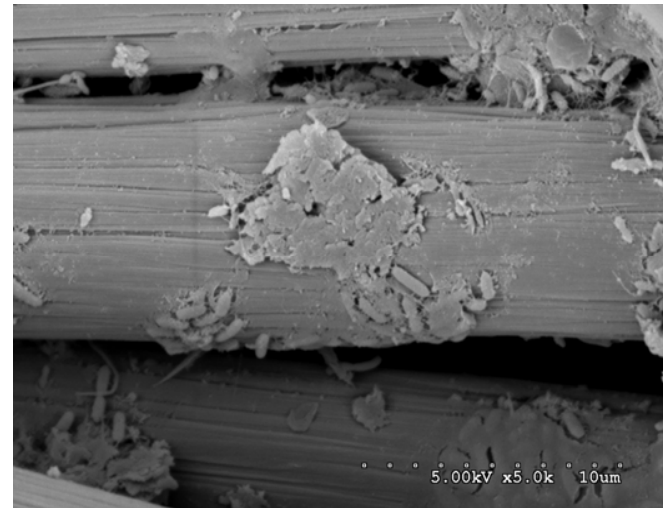
- ◆ Imaging Center, Snyder Hall



Microbial Fuel Cell Setup

## MAJOR OBSERVATIONS

- ◆ Different sources of bacterial inoculum result in similar current output in MFCs (within 18%).
- ◆ Cyclic voltamograms and differential pulse voltamograms taken at steady state differ for MFCs with different inoculum, indicating that the microbial physiologies are different also.
- ◆ Lactate appears to be the primary electron donor while butyrate is a secondary donor of electrons for energy generation.
- ◆ The electrodes appear sparsely covered with bacteria indicating that there may be some coating that interferes with biofilm formation on the electrode.
- ◆ There are indicators of “nanowires” that can be seen in the SEM.



SEM of electrode