Objective

To design a Biobattery: an electrically monitored and regulated array of Microbial Fuel Cells (MFC)

Microbial Fuel Cells

A MFC is a device the converts chemical to electrical energy that is catalyzed by a microorganism, typically containing two chambers.

**Bacteria:** Geobacter Metallireducens  
**Electrode Material:** Carbon Cloth  
**Membrane Material:** Nafion vs Cellophane  
**Membrane Electrode Assembly:** Sandwich Facultative Aerobic Bacteria

![Biofilm formed by Geobacter](image1)

**Story of Electrons:**

**Anode**
- Electrons travel from Acetate to Geobacter
- Geobacter sends electrons outside itself to electrode

**Cathode**
- Electrons combine with Oxygen and Protons to form water

Power Management

![Schematic](image2)

**Regulation**

- **Output:** 4.75V-5.25V, 100mA-500mA for USB Compatibility  
- **Must step up voltage from 3.0V to 5.0V**  
- **Maxim MAX1524 Boost Controller**

Anode Cube

Current research has not been particularly focused on volumetric power density, but this is a critical factor in the viability of a Biobattery as a realistic power source. In response to this, Ecowatt worked to design a new cell arrangement that drastically improves upon the existing configurations: the Anode Cube.

![Anode Cube](image3)

Feeding And Water System

The Feed and Water System will manage the flow of feed solution into the MFC as well as the flow of water solution out of the MFC. The Food Solution Bladder can be replaced when empty, and the Water Tank can be safely poured down the drain.