Registration Form

TEAM INFORMATION

Team Name/Project Title: Inexpensive, Sustainable, and Remote Water Treatment

Department: Electrical Engineering

Faculty Advisor(s): Brian Atkinson, Dan Connors

Team Member: Matthew Versteeg

PROJECT INFORMATION

Description:

This project is a water desalination system that utilizes a multi-use computer control system with inputs and outputs for sensors, motors, and other DC components. The system interface is a web-based application.

Abstract:

Small scale remote water treatment and desalination is an issue around the world that is in desperate need of innovation. I teamed up with a research student from UC Boulder to design and build a computer controlled water desalination system with capacitive deionization (CDI) cells made from activated carbon. The current configuration includes water level, temperature, electrical conductivity, and pH sensors, as well as multiple 12V solid state switching configurations for switching valves and PWM for pumps. The 12 volt system will be used as a pilot in Tanzania or The Gambia as a solar powered water quality sensor or brackish water desalination tool. I am using microbial fuel cells (MFCs), or in this configuration, CDI cells to create a flow-through capacitive deionization process to remove salt, calcium, and bio-matter from water. I remove metals, in this case, salt, by applying a small voltage to the cells; if this voltage were not applied, the cell could act as a sensor that outputs a voltage that is dependent on organic content in the water. Having the ability to remotely check the status of and control the system is a major benefit.