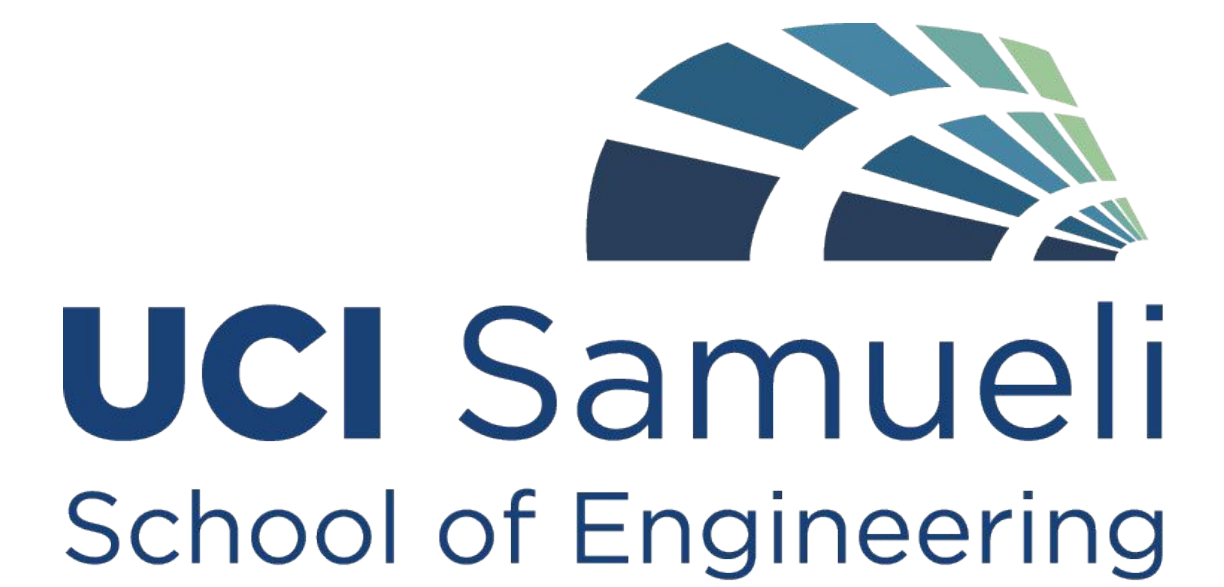


Fuel Cell Battery

Advisor: Professor Yun Wang

Members: Chris Jun Young Kim, Reagan Yap, Shunjie Jia



Background: Why Proton Exchange Membrane Fuel Cells (PEMFCs)?

1. Only water as a by-product and zero pollutant emissions (NO_x, CO, HC)
2. Fuel cells are more efficient at the same scale; use less fuel and generate more energy
3. Hydrogen is abundant; can be produced from renewable energy
4. Completely renewable system when paired with solar-powered electrolysis

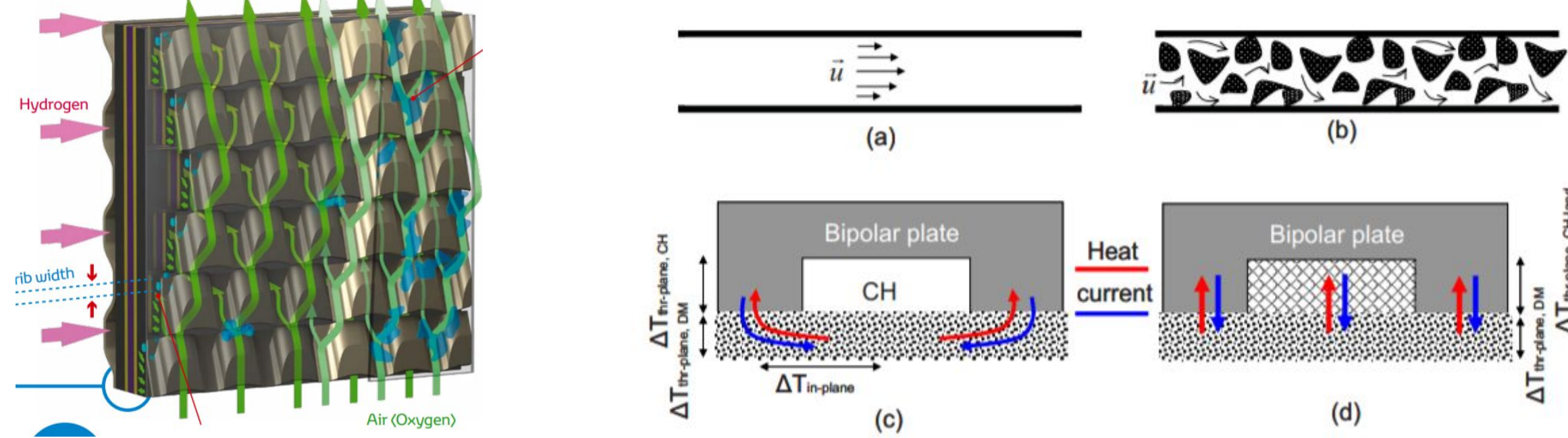
Goals: Improve PEMFC static performance using an inexpensive solution

Requirements:

1. Achieve Department of Energy 2020 targets of 0.8V cell potential when outputting 300mA/cm²
2. Achieve a limiting current density of 1.5A/cm² with air as the oxidant

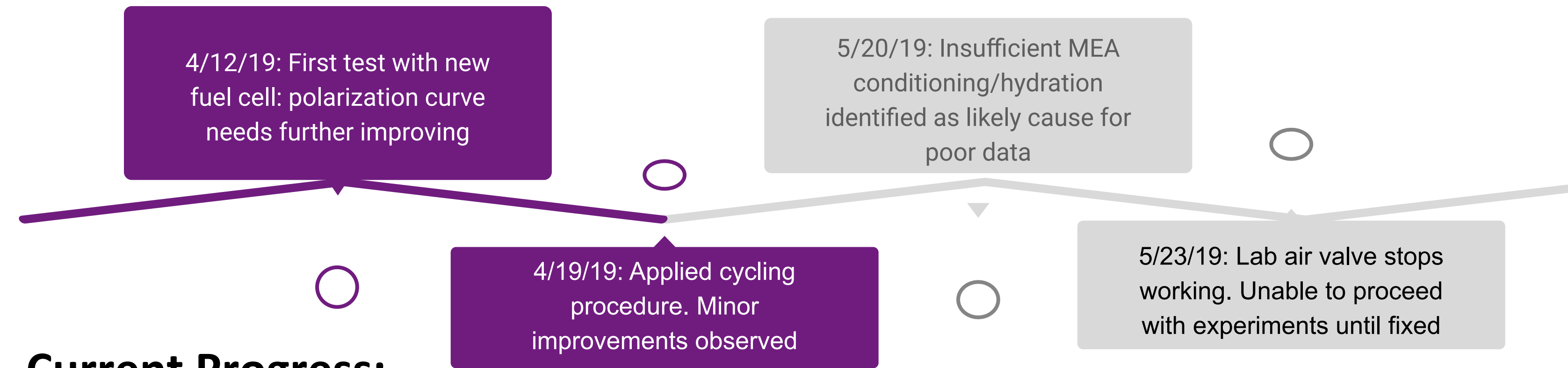
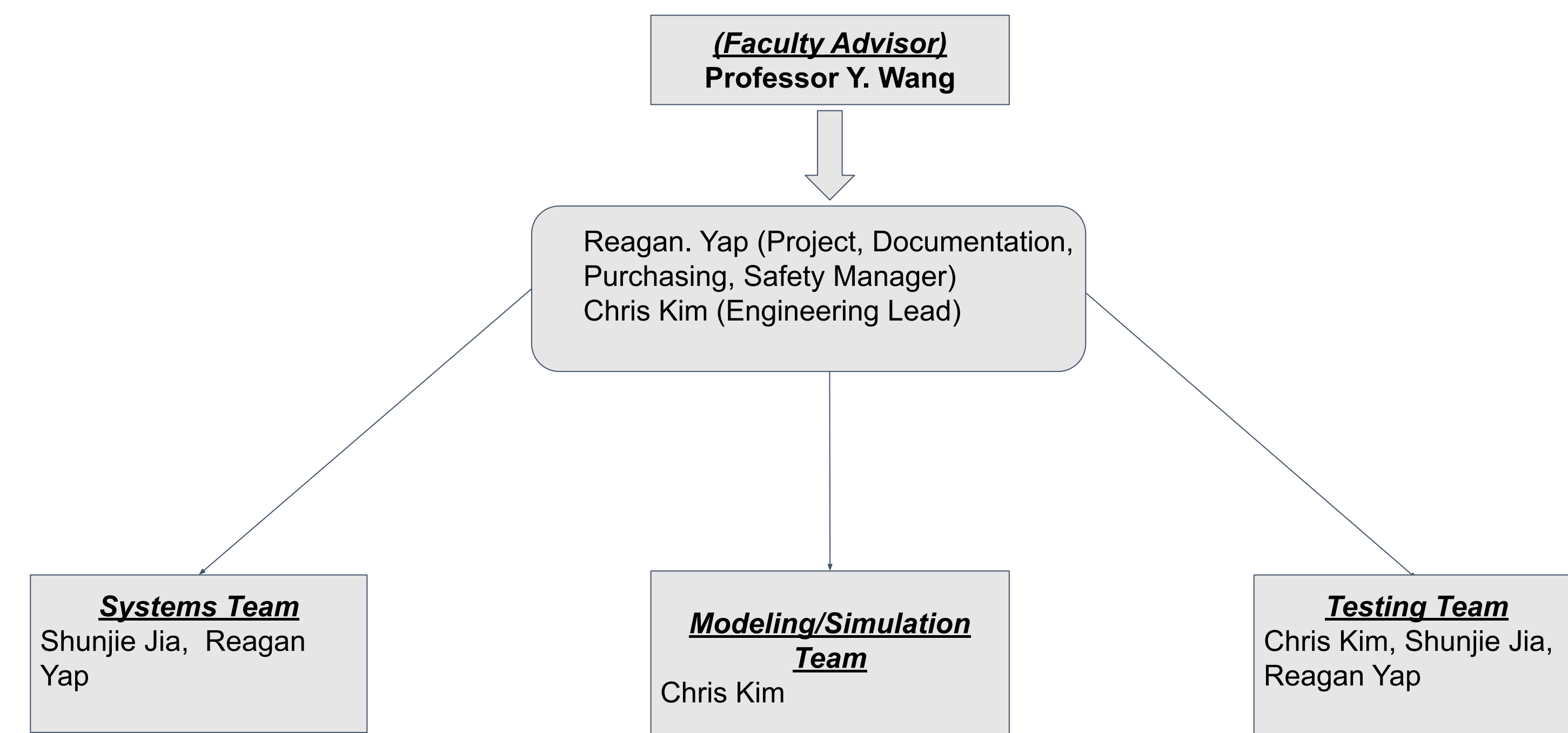
Innovation:

Reactant distribution through porous flow media rather than conventional flow channels for enhanced heat and electron transfer



The Bigger Picture:

In order to support the transition from unsustainable energy sources to renewable alternatives, Team Fuel Cell Battery strives to improve the capability of PEMFC's through manufacturing, testing, and modelling a Porous Media (PM) PEMFC.

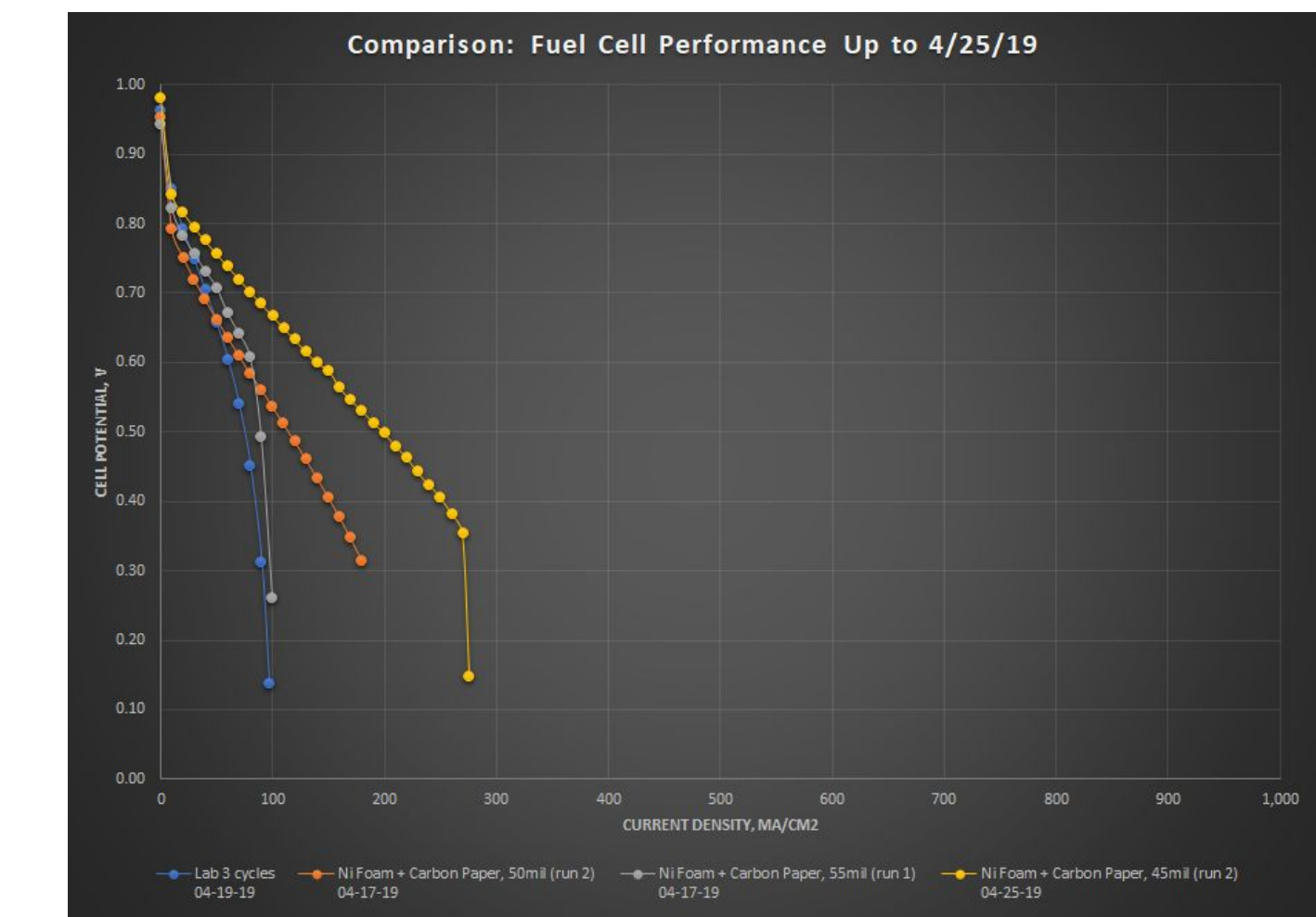


Current Progress:

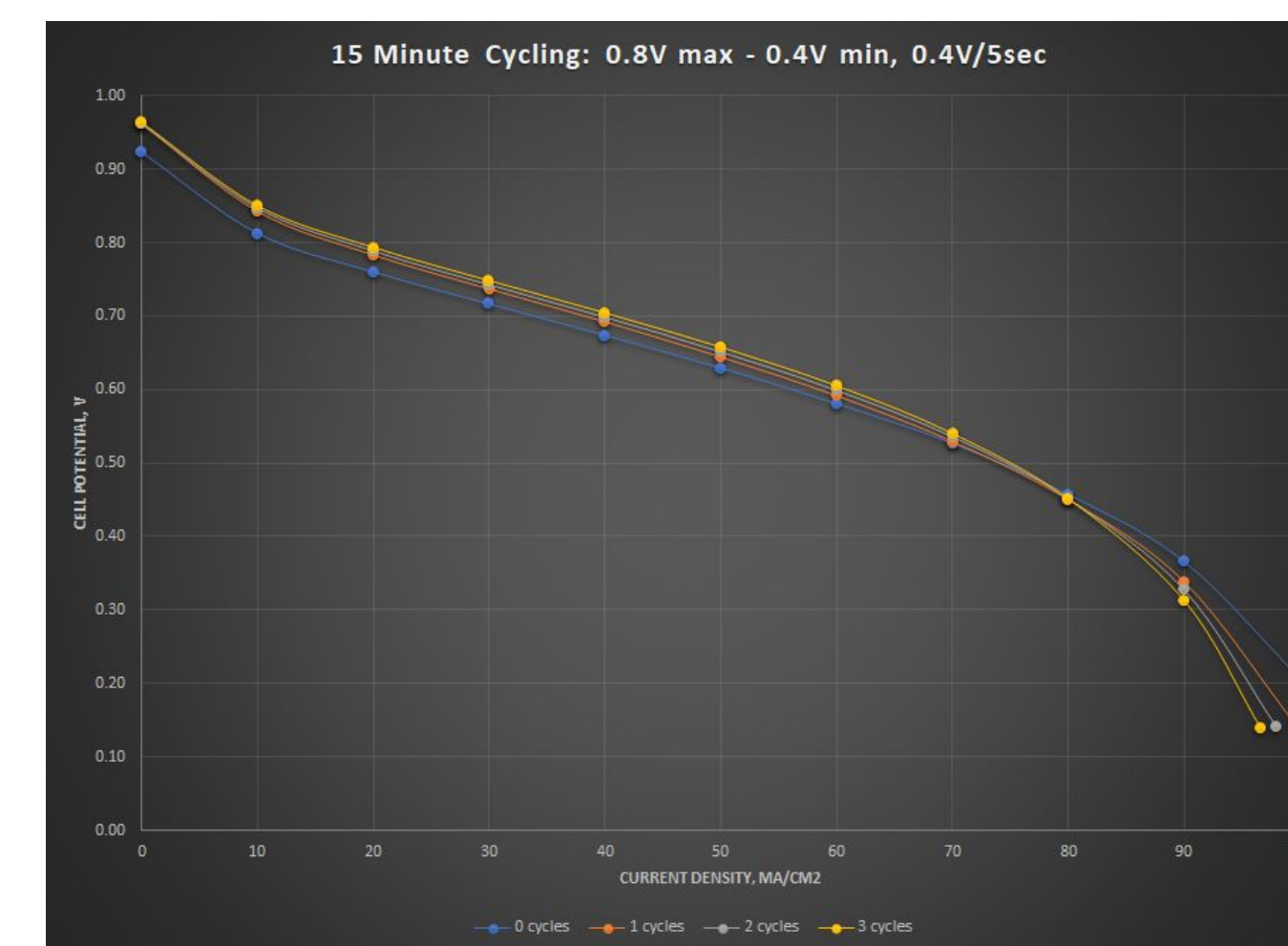
Fuel Cell with Heating Pads Assembled



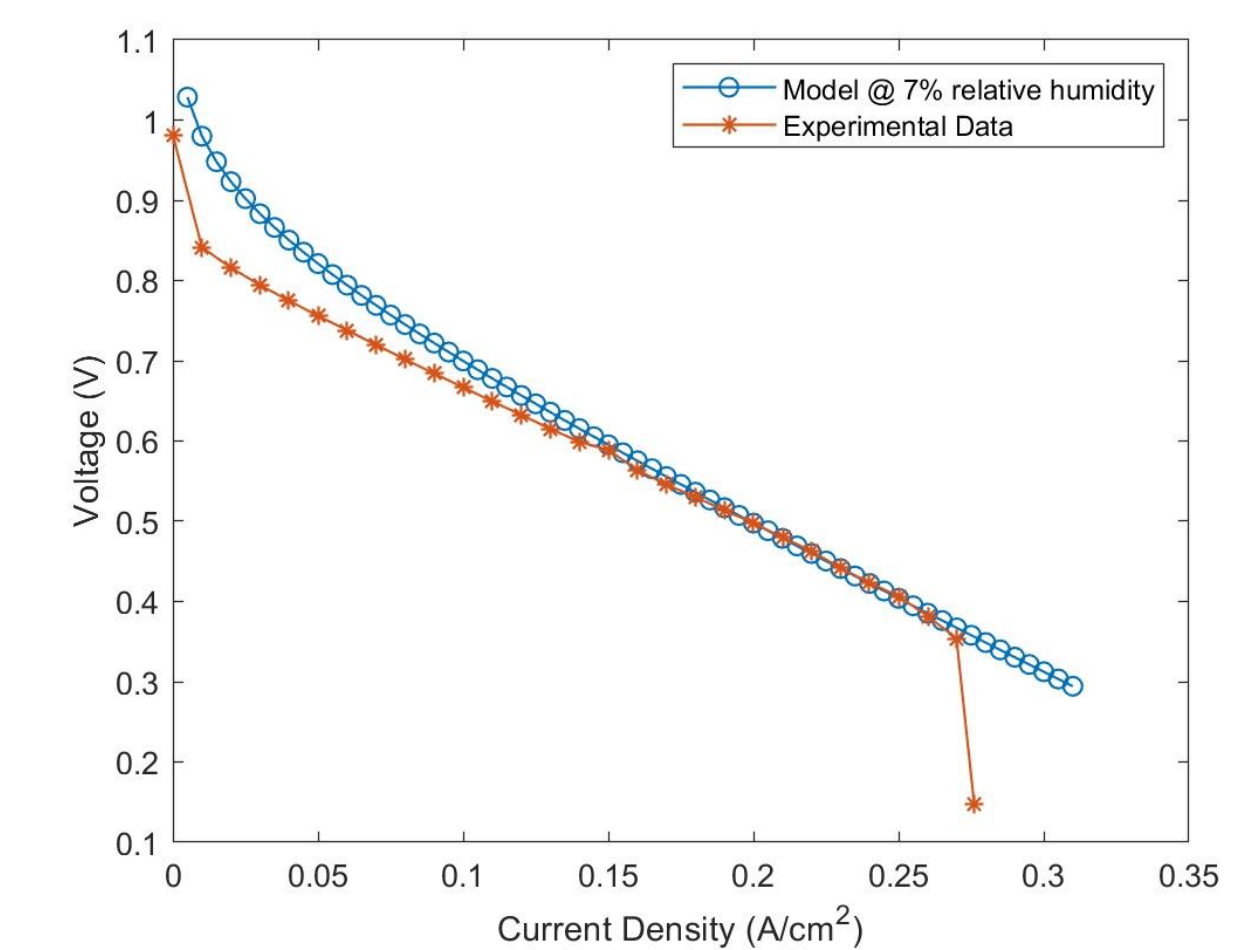
Polarization Curves for Various Fuel Cell Configurations



Effects of Short Duration Cycling



Simulation vs Experiment: Ohmic Loss due to Insufficient Membrane Hydration



Future Tasks

1. Implement MEA conditioning step into experiments
2. Testing at different pressures and membrane hydration
3. Compare data for porous flow field vs flow channel fuel cell

Contact Us:

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