



Theodore St. Francis

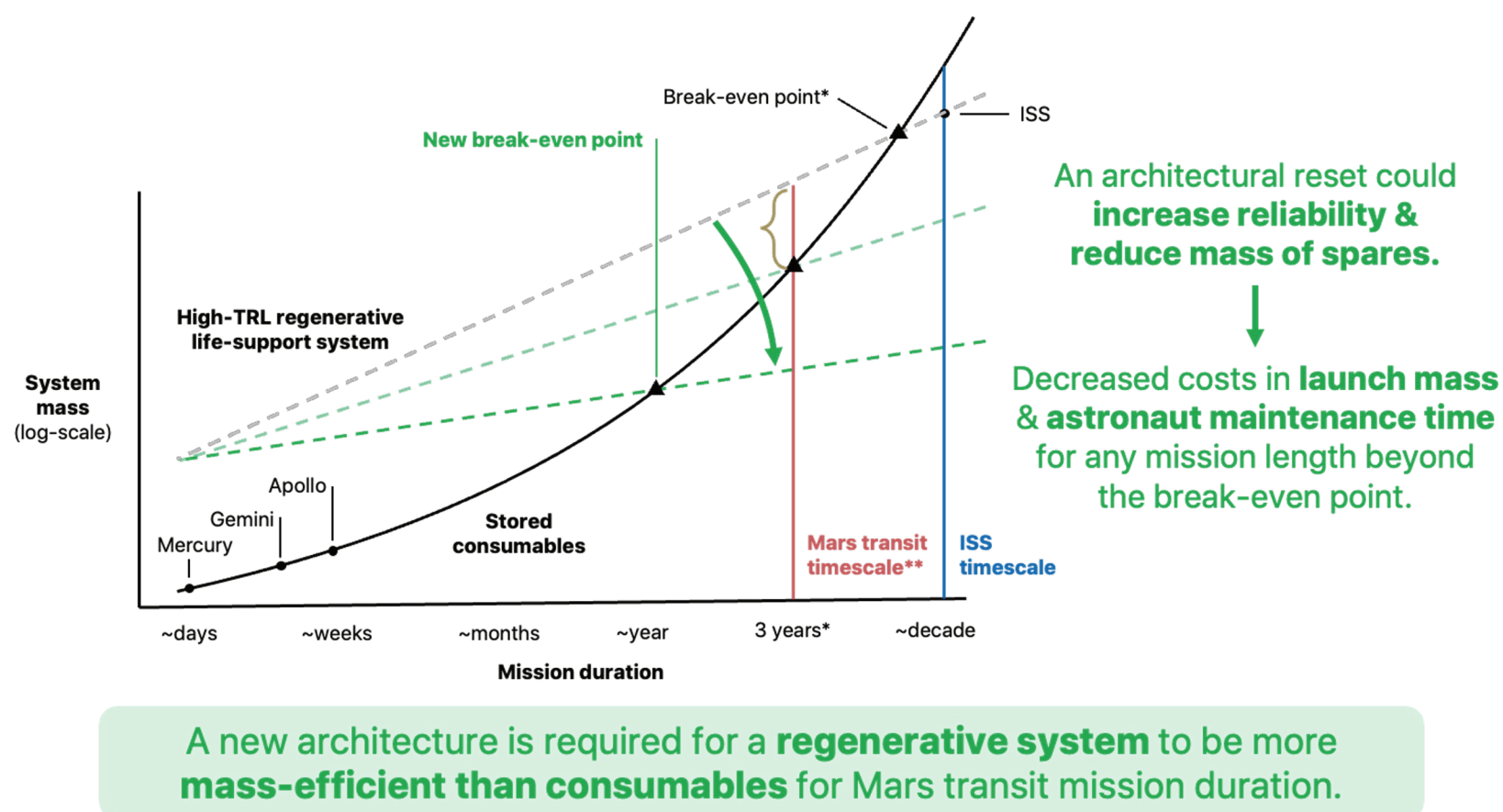
John and Mary Franklin Foundation Award
Ph.D. Student, Aerospace Engineering
Second Year ARCS Scholar



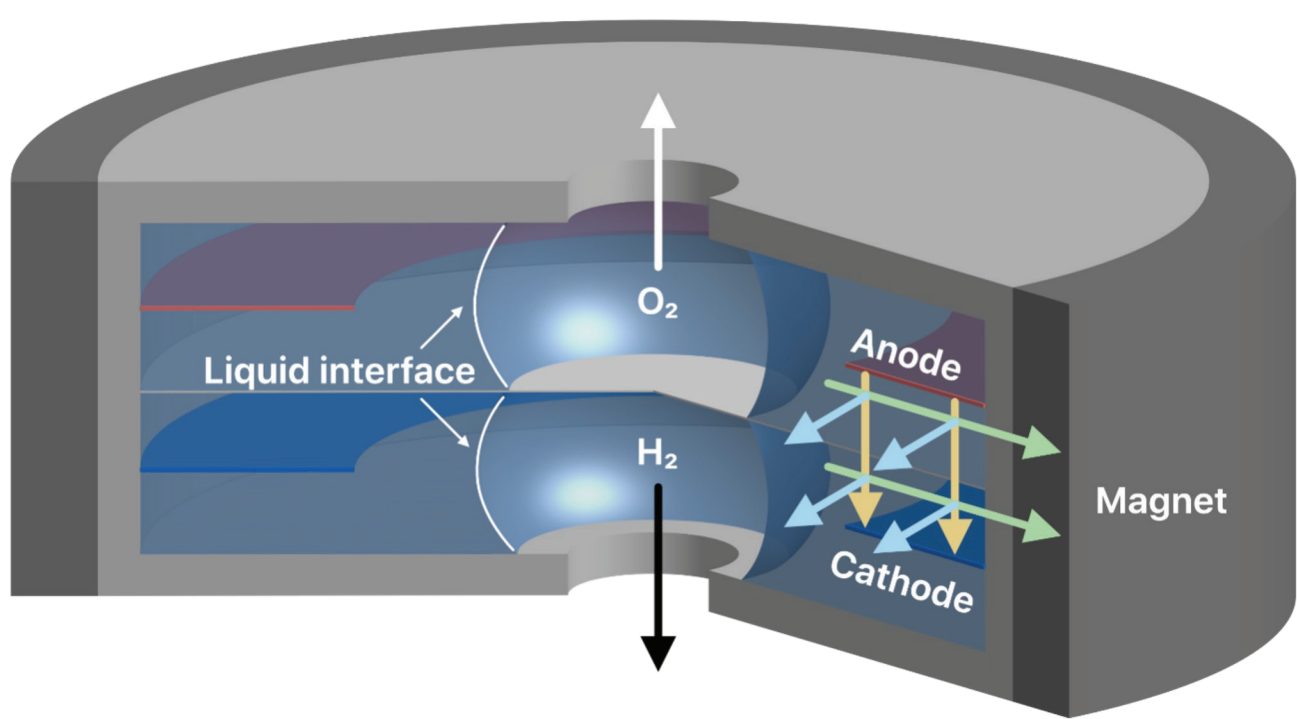
A Novel Magnetohydrodynamic Drive for Oxygen Production on a Crewed Mars Mission

The Magnetohydrodynamic Oxygen Generation Assembly (MOGA) employs a permanent magnet in an electrolytic cell to produce and separate oxygen and hydrogen efficiently in microgravity without moving parts.

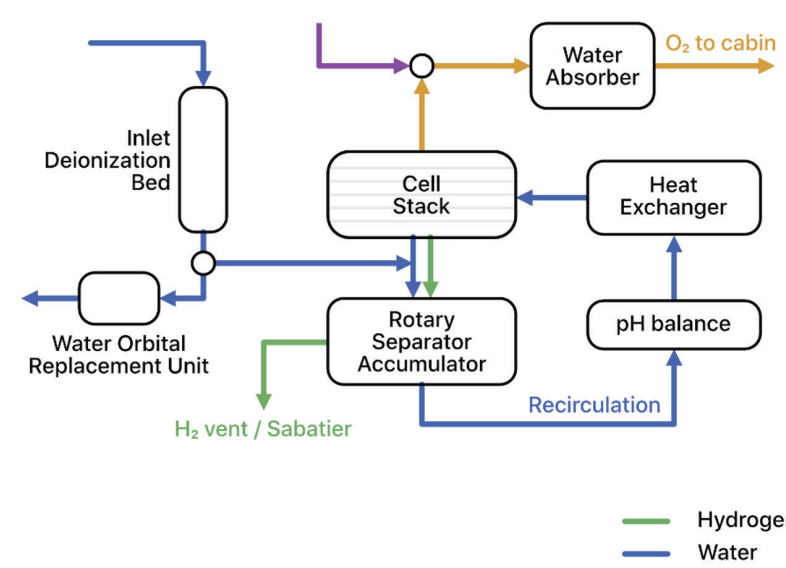
Why do we need a new oxygen system architecture?



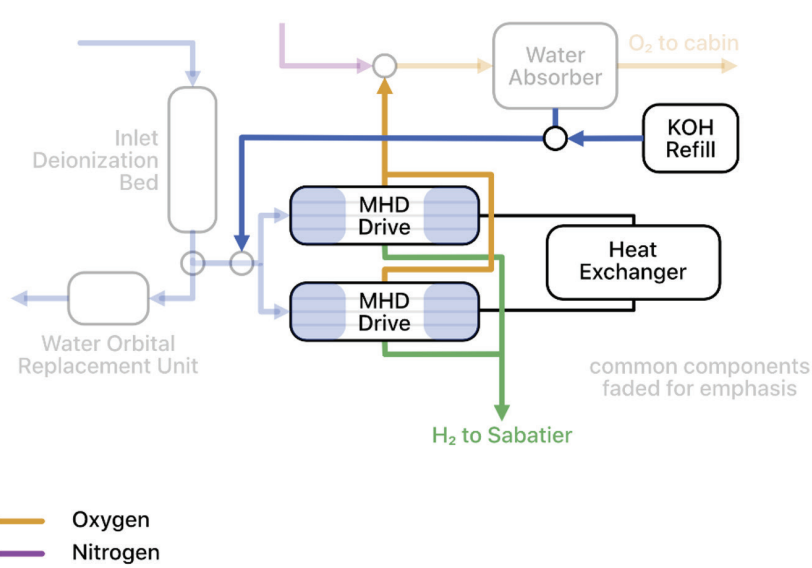
The Magnetohydrodynamic Drive Schematic



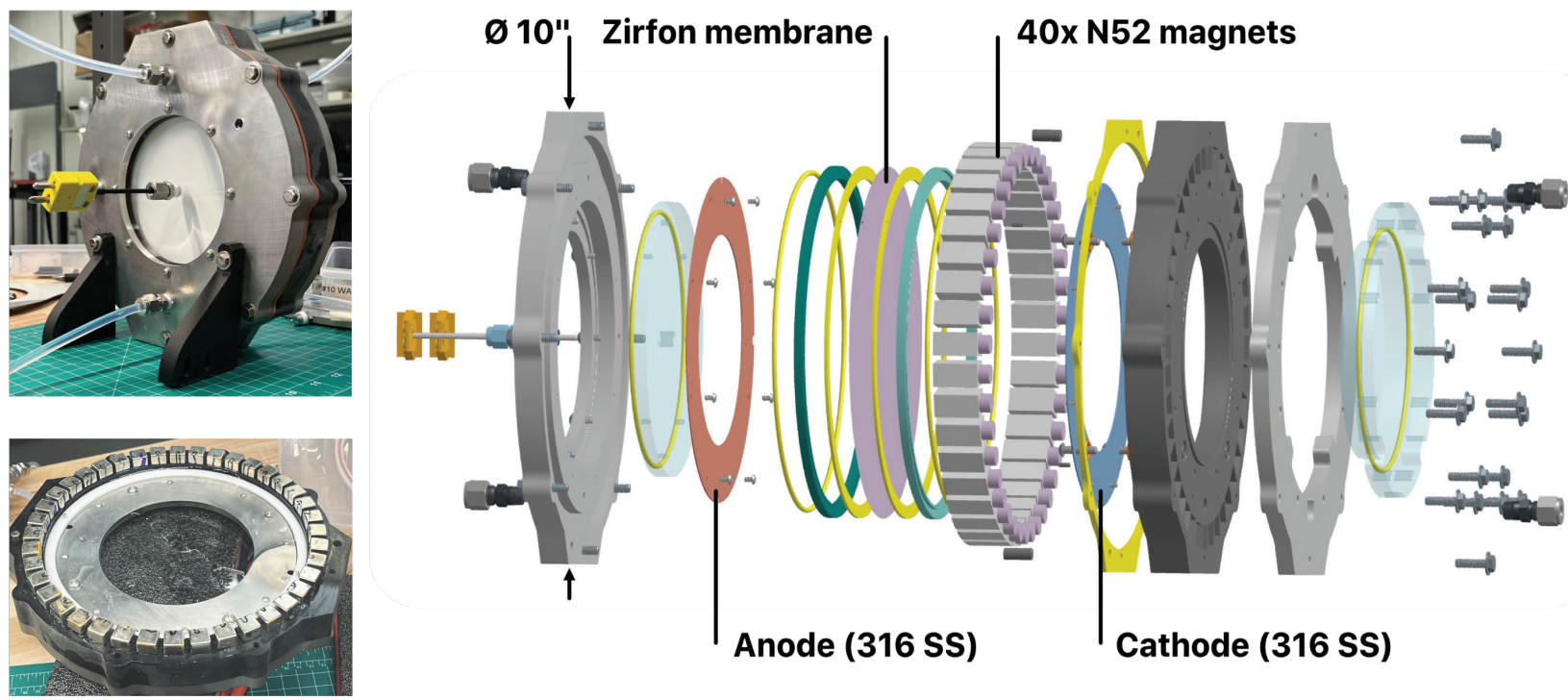
Oxygen Generation Assembly (OGA)



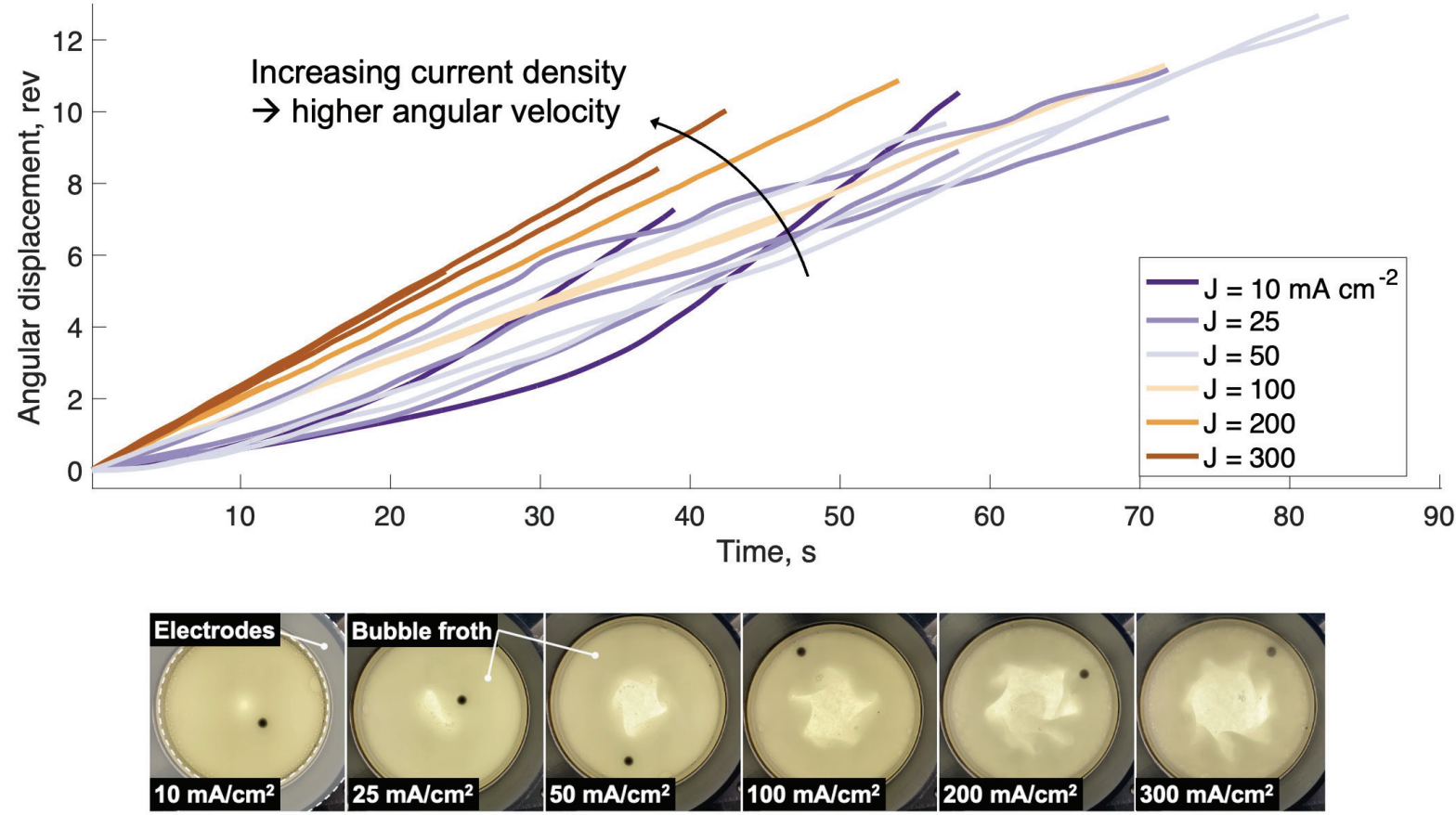
Magnetohydrodynamic Oxygen Generation Assembly (MOGA)



MHD3: Magnetohydrodynamic Drive Demonstrator



Characterizing Magnetohydrodynamic Swirling

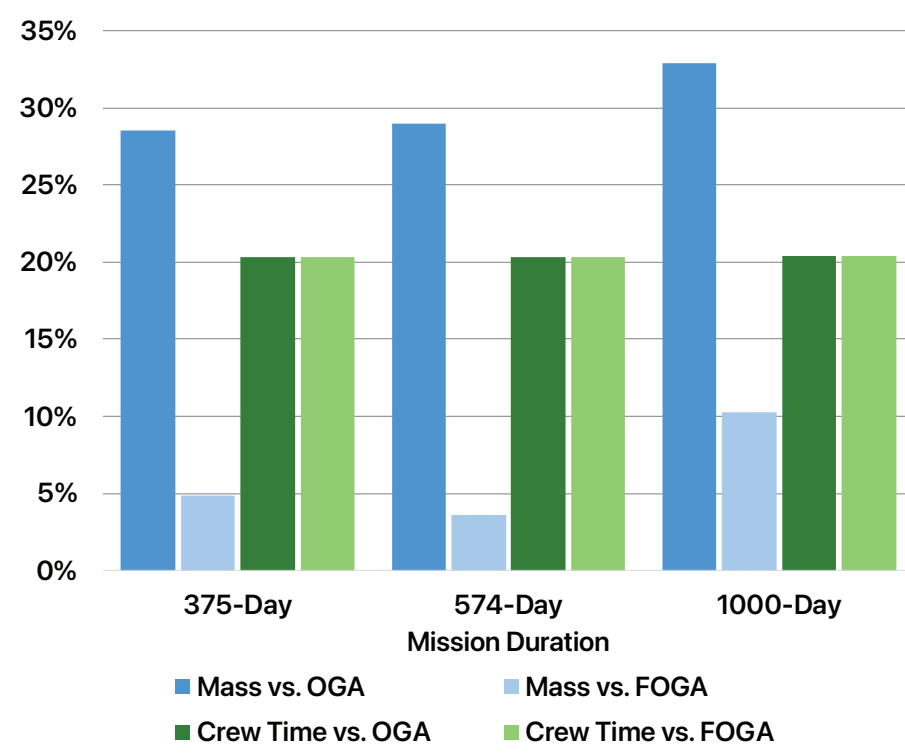


Savings in System Mass and Crew-Time for Maintenance

OGA: Oxygen Generation Assembly

FOGA: Future OGA

Bottom line: the Magnetohydrodynamic OGA is a promising advancement in exploration life-support architectures.



Scholar Awards Celebration
November 12, 2025



Igniting
Innovation
in Georgia