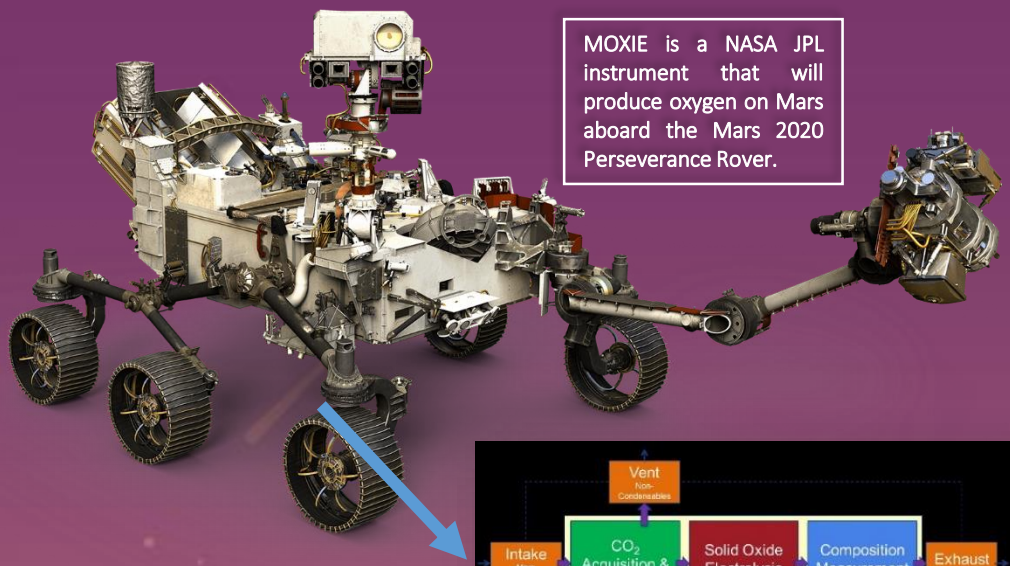
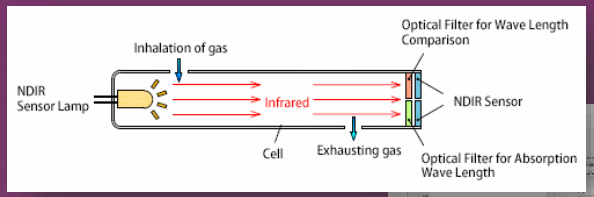
Marianne Paguia Gonzalez

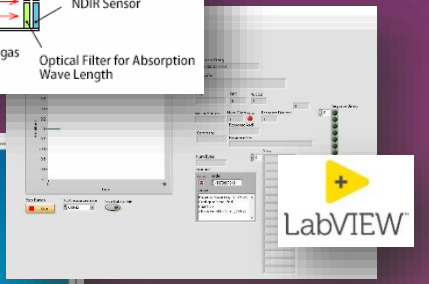
My Portfolio

Mars Oxygen In-Situ Resource Utilization Experiment

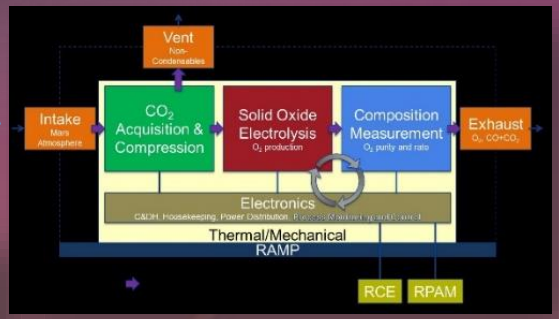


MOXIE is a NASA JPL instrument that will produce oxygen on Mars aboard the Mars 2020 Perseverance Rover.





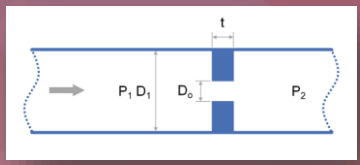
I was cognizant of the compositional optical gas sensors and pressure transducers for the instrument. I helped choose commercial sensors and wrote LabVIEW programs in order to establish communication and test their functionality. I was responsible for maintaining sensor inventory and gathering data for the thermal, shock and vibration tests.



I wrote a dynamic system engineering model in Matlab and Matlab Simulink. This simulator was capable of running flight-like software tables to simulate operation on Mars. It also used flight-like digital numbers and resolution to model the control algorithms. In addition, it modeled the basic dynamics of the electrochemical production of oxygen, pressure rise times, and heating of the electrochemical plant.

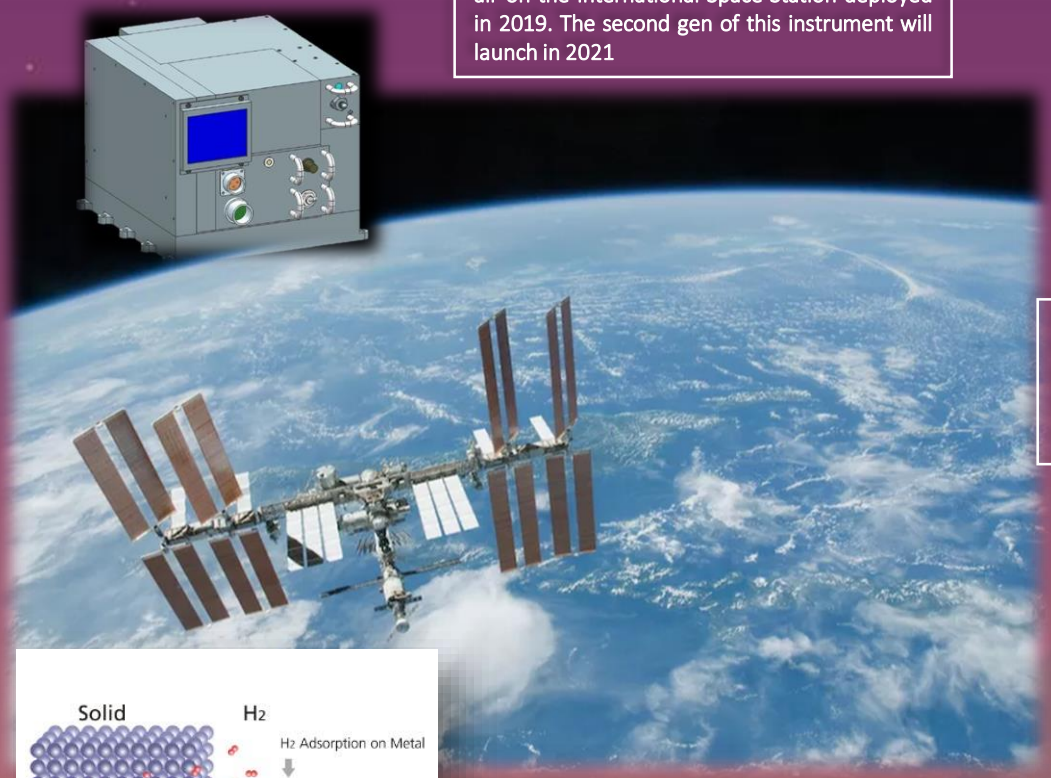
SOLIDWORKS

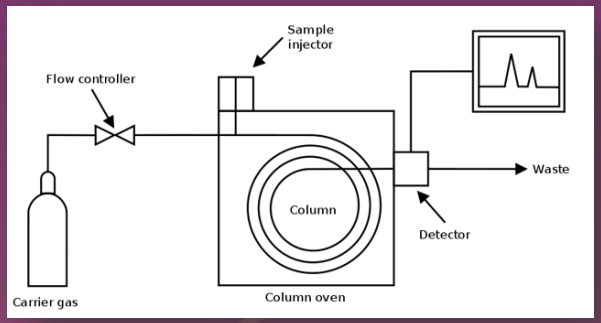
I designed several prototypes and a flight SolidWorks design of an orifice flowmeter that can determine the instrument's flow rate based on differential pressure. I characterized the flowmeter so that ground data can be processed during the mission.



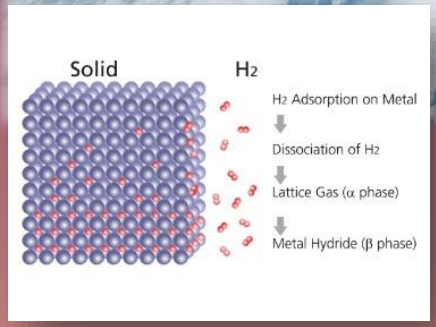
Spacecraft Atmosphere Monitor

S.A.M is a NASA JPL instrument analyzing cabin air on the International Space Station deployed in 2019. The second gen of this instrument will launch in 2021

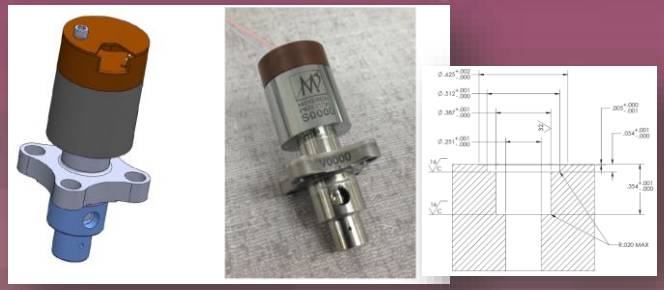




I write and help execute instructions for building and testing of the Gas Chromatograph subsystem. These build procedures include leak and proof testing of pressurized and vacuum components. It also involves performing functionality tests and safe to mate measurements of valves, platinum resistance thermometers, heaters, regulators and pumps.



I am cognizant of the carrier gas metal hydride tank for the Gas Chromatograph. I designed and built a hydrogen fill station for tank and wrote standard operating procedures. I also performed thermal tests on the tank with its diaphragm regulator to characterize desorption behavior.

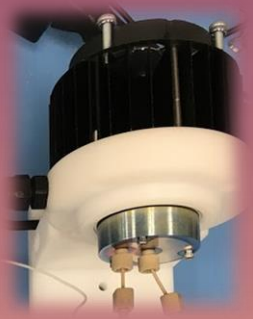


I am responsible for tracking and testing commercial solenoid valves and verifying their functionality. I test their leak rate in vacuum conditions to ensure that they meet manufacturer specifications. I also helped support custom manifold designs in order to accommodate the valve seat

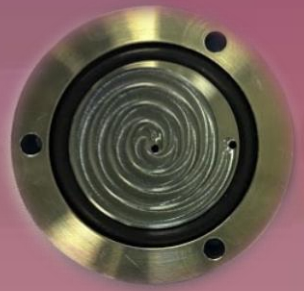
mini **T**otal **O**rganic **C**arbon **A**nalysis

miniTOCA is a NASA JSC and JPL oxidation and sensor instrument intended to replace the carbon analysis system currently monitoring the water on the ISS.

I designed several 3D printed and machined prototypes for the reactor that is used to oxidize water. This involved collaboration with manufacturing engineers to create different geometries and substrates. These caps were then treated using various methods to create a photocatalytic layer.



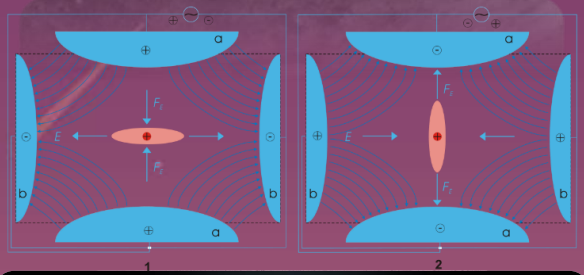
I worked with vendors to develop a custom designed UV lamp. I tested different lamps at different UV outputs to evaluated the performance based on conductivity/laser measurements.



More Projects

RP- Resource Prospector

This instrument was meant for direct in-situ analysis of lunar regolith aboard a rover. I designed a composite enclosure for the gas chromatograph. I also performed several experiments to evaluate the influence of fluid line dimensions on the quality of the GC data.



Hypervelocity Ice Gun Sampling

This project's goal is to develop instruments that can analyze icy ocean worlds such as Europa, to search for hints of life. I am responsible for designing and testing the collision and calibration gas system prototypes with a Paul ion trap mass spectrometer.

JPL Next Program

The JPL Next Program's purpose is to come up with concepts for missions that will occur in the next few decades. I am responsible for coming up with an early design for a science instrument that will submerge into an ocean world. This instrument will evaluate habitability and search for life.

Ventilator Project for COVID19

This project achieved successful development of FDA approved ventilators designed for mass production in response to the COVID19 pandemic.

Skills and Trainings

Integration and Testing, CAD Design, SolidWorks, NX SIEMENS Teamcenter, Integration and Testing, Part Design, Prototyping, Fluid Systems, High Pressure Systems, Vacuum Systems, LabVIEW, Data Analysis, MATLAB SimScape, Excel, Life Support Systems, Advanced Environmental Systems, Systems Modeling, Gas Chromatography, Mass Spectrometry, Cleanroom Operations

ESD Control, Cleanroom, Mate De-mate, Anomaly Investigation, Pressure Safety, High Voltage, Hydrogen Safety Human Factors in Mishaps & Close Calls

Thanks for reading!