



# Membrane Extraction for Space Applications (MESA)



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**Target:** Ocean Worlds, Icy Moons: Europa and Enceladus (surface, subsurface, and flyby)

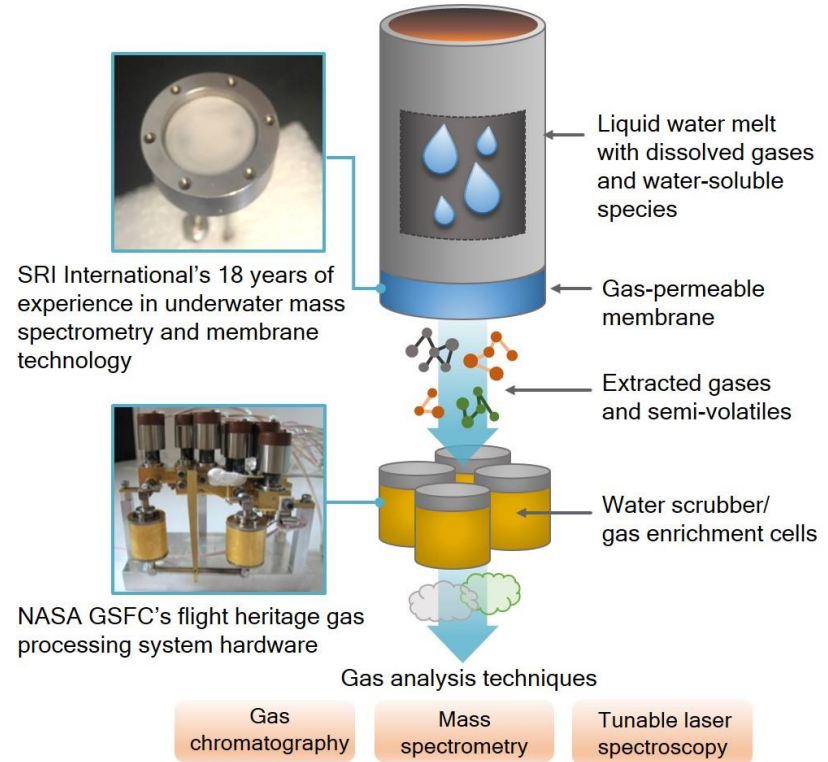
## Science:

- Identify volatile biomarkers and products of radiolysis to support life detection and exploration of habitability
- Measure isotopic ratios of noble gases and other gases in plumes, water, and trapped in ice
- Perform depth profiling of dissolved gases of geological and biological interest

## Objectives:

- Demonstrate efficacy of static membrane extraction targeted for space applications
- Enhance membrane extraction system for extraction of dissolved atmospheric gases, biomarker gases, noble gases, alkanes, and volatile organic compounds
- Optimize heritage scrubbers and concentrators for analysis of same analyte suite
- Create MESA breadboard system that combines static membrane extraction, scrubbers and enrichment cells, and complete functional testing

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The MESA concept combines SRI and GSFC expertise

## Key Milestones:

- Construct and test initial MESA breadboard (Yr1)
- Optimize heritage water scrubbers (Yr1)
- Improve static membrane extraction module and materials (Yr2)
- Integrate scrubbers & enrichment cells into MESA breadboard (Yr2)
- Finalize MESA breadboard and complete functional tests (Yr3)

TRL 3 to TRL 4