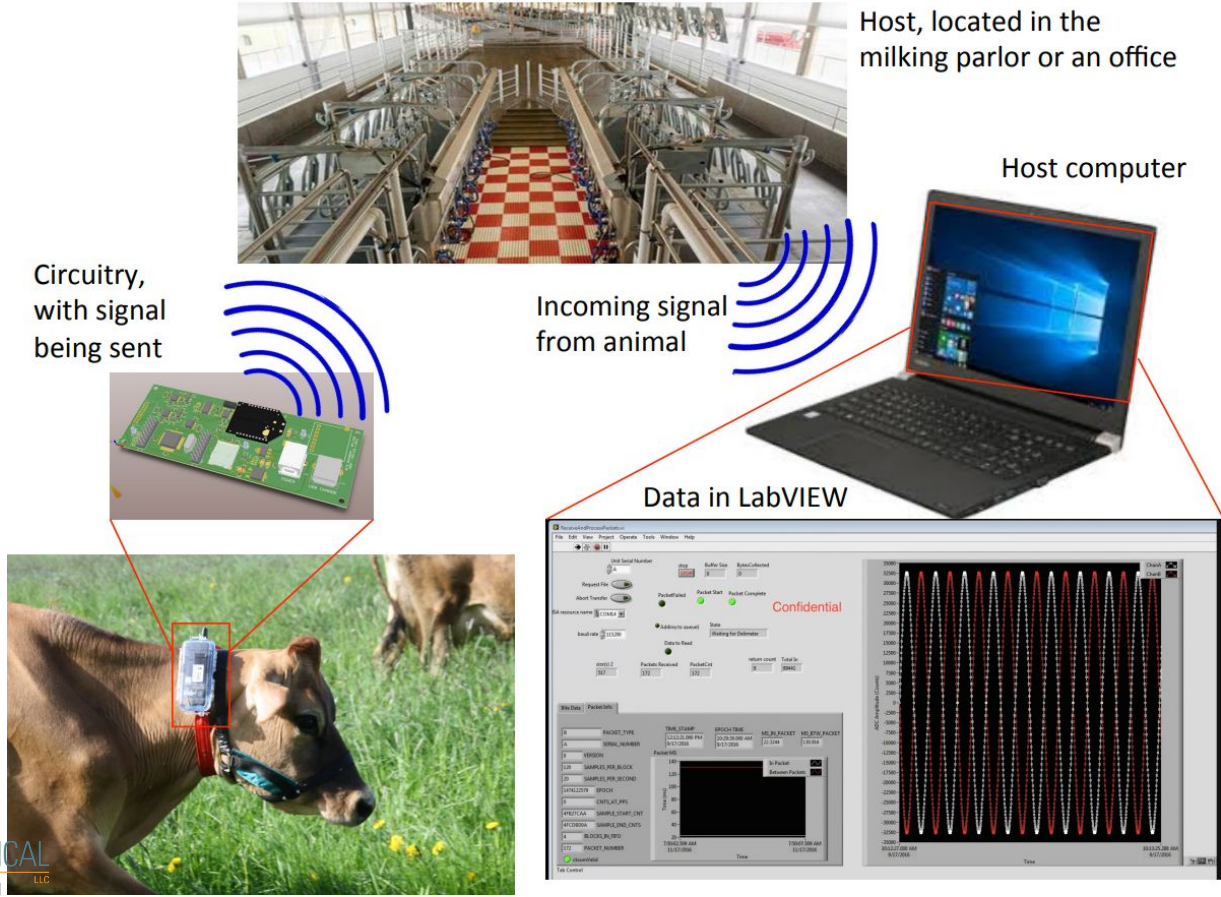


Unique Instrument Applications

John R. Leeman

GEARS 2023

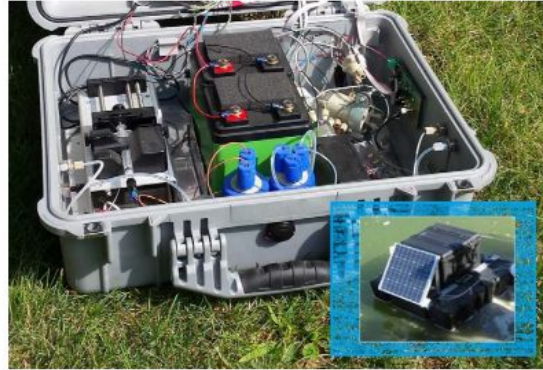
USDA dairy cattle monitoring for feeding preference, heat stress, more



USDA's fully automated, field portable instrument for monitoring nutrients and inorganic contaminants in fresh water

Technology Overview

- Produces no waste
- Uses less than 50 mL water per month
- Solar power capable
- Adaptable to a range of contaminants
- Comparable sensitivity to bench-top instruments

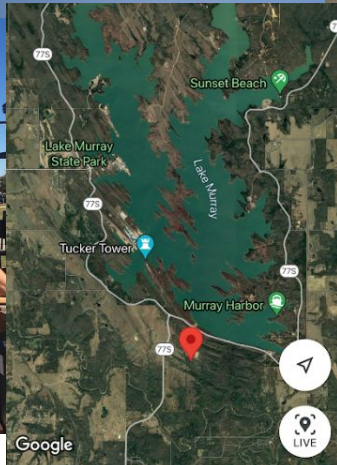
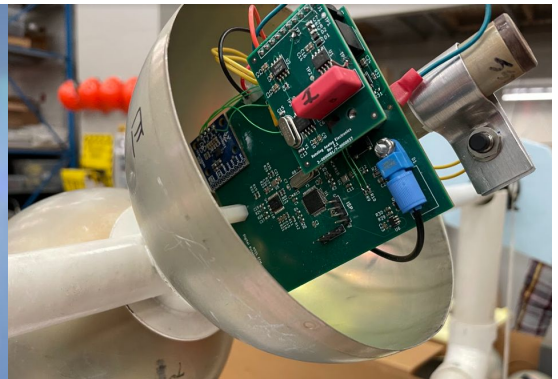


USDA's field portable ion chromatograph (FPIC) water sensor can be used to measure contaminants and nutrients in any fresh water source

Instrumentation features

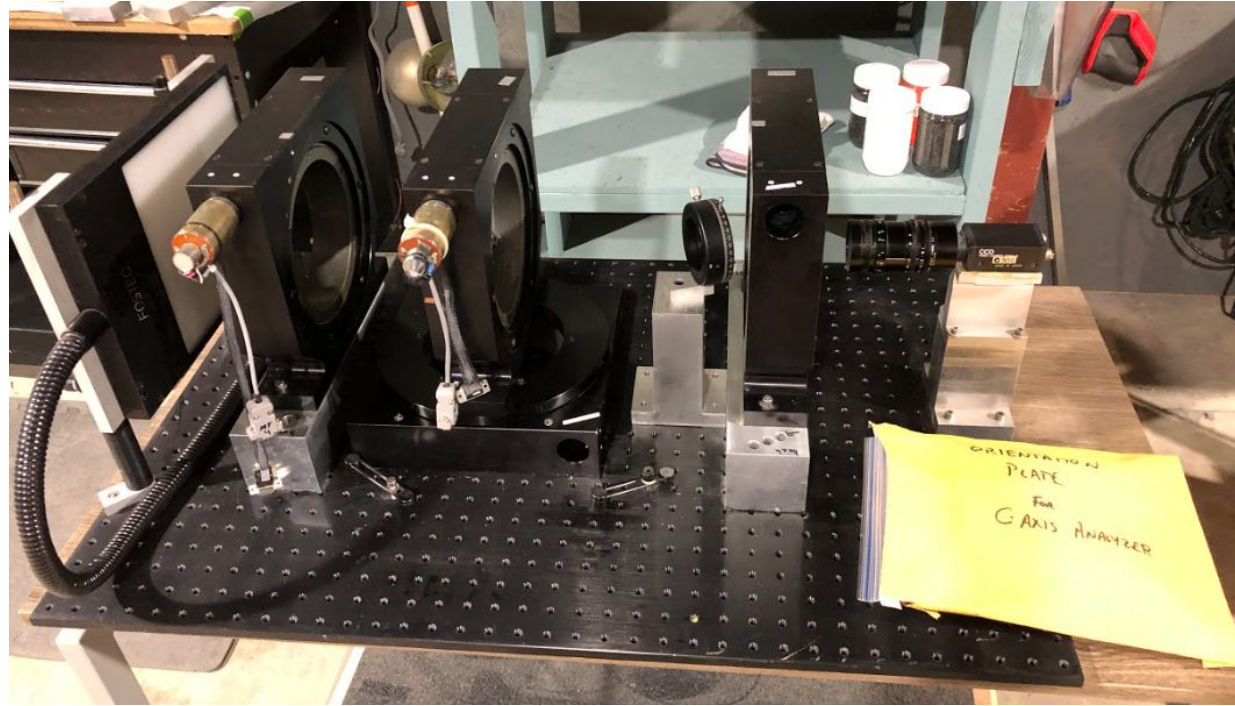
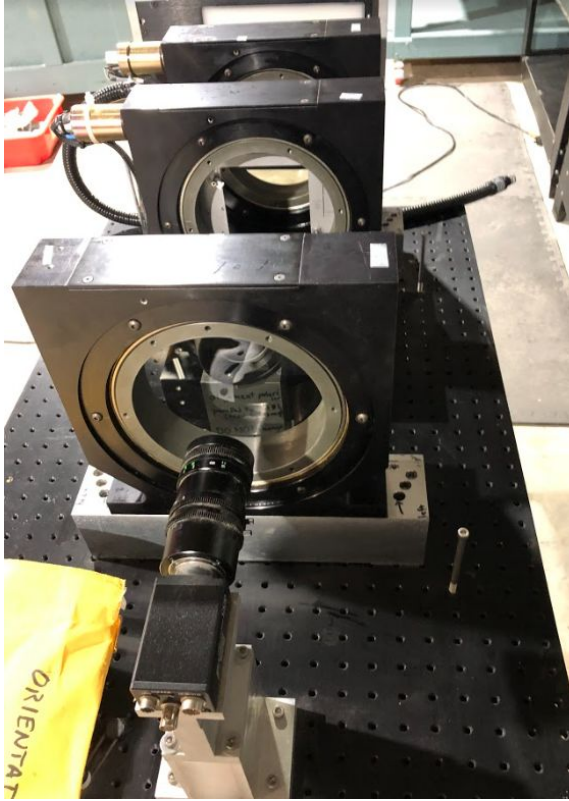
- Fully unattended operation with adaptive sampling rate
- Real-time data acquisition, processing and reporting
- Telemetry capabilities for data viewing, or error reporting
- High surface area filtering for extended sampling life between scheduled maintenance intervals

Measurement of 3D E-Field in the atmosphere

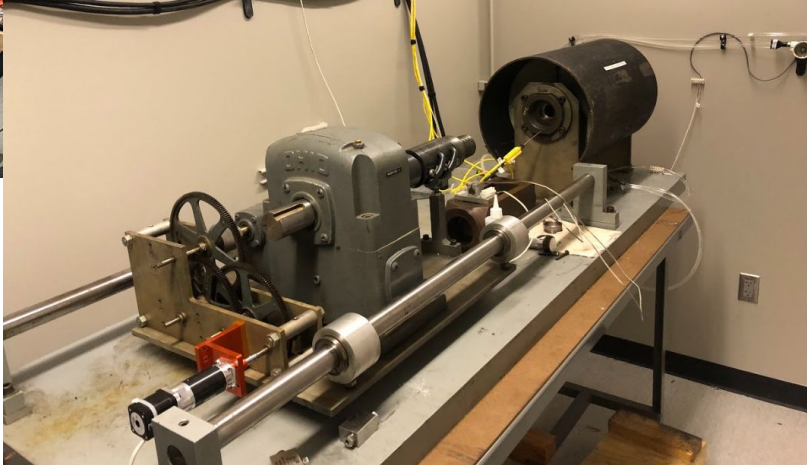
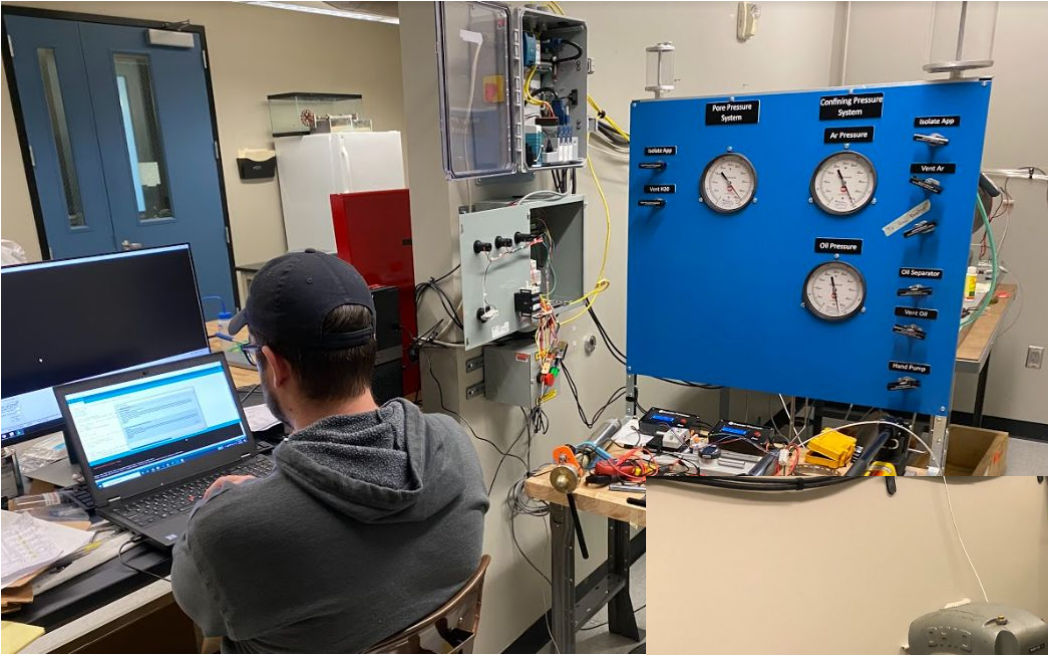




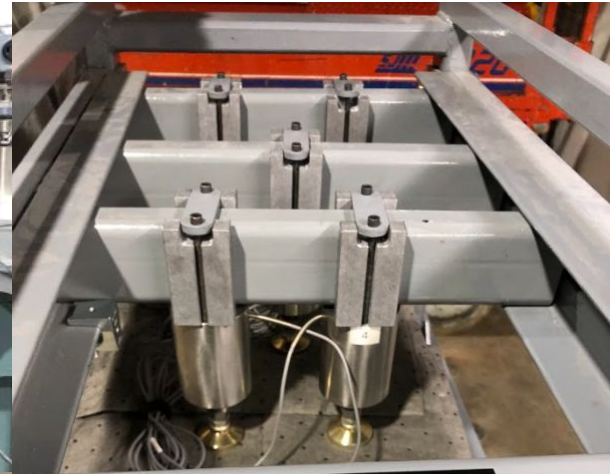
Measuring the orientation of ice grains for glacial flow history



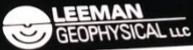
Controls on high temperature, high pressure rock rig



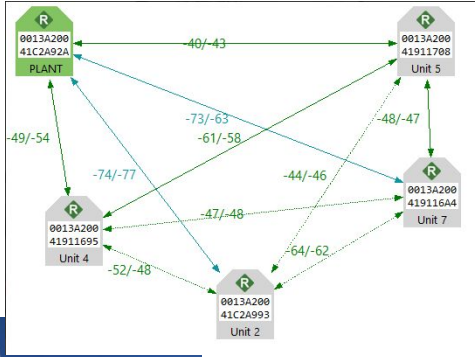
Design, build, and implementation of simple shear deformation machine



Load Limits
Maximum Load Per Jack Screw 2000 lbs (9.09kN)
Maximum TOTAL Normal Load 5000 lbs (22.26kN)
Maximum Shear Load 4280 lbs (19.4kN)



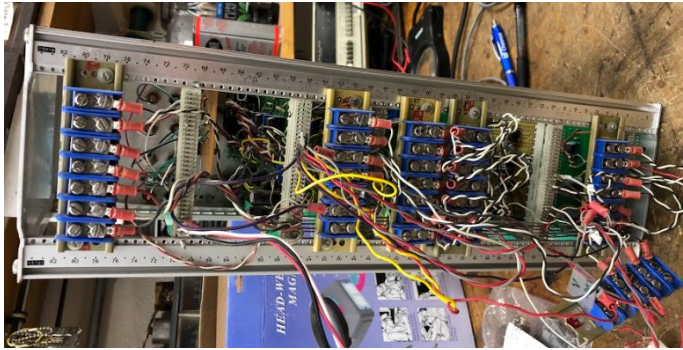
Sending data on geothermal wells across the desert



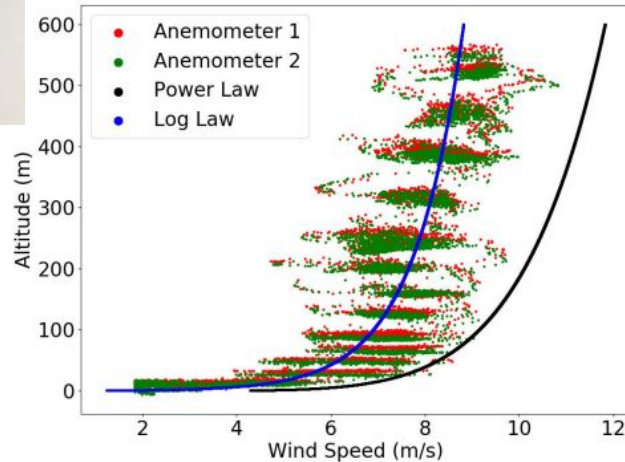
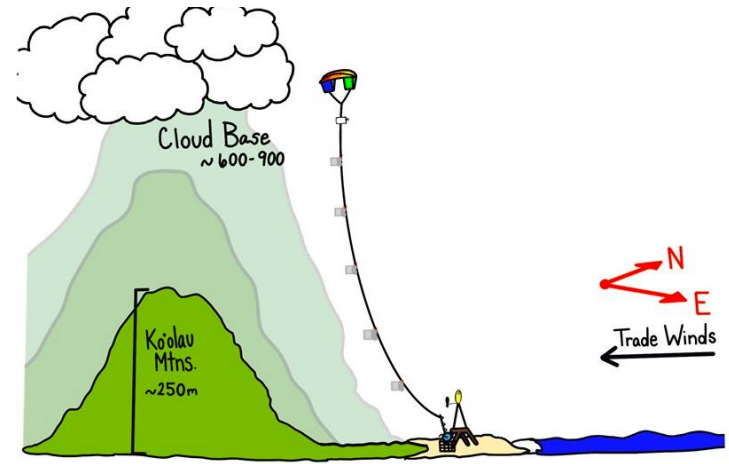
Monitoring evolution of gas from coal samples freshly mined



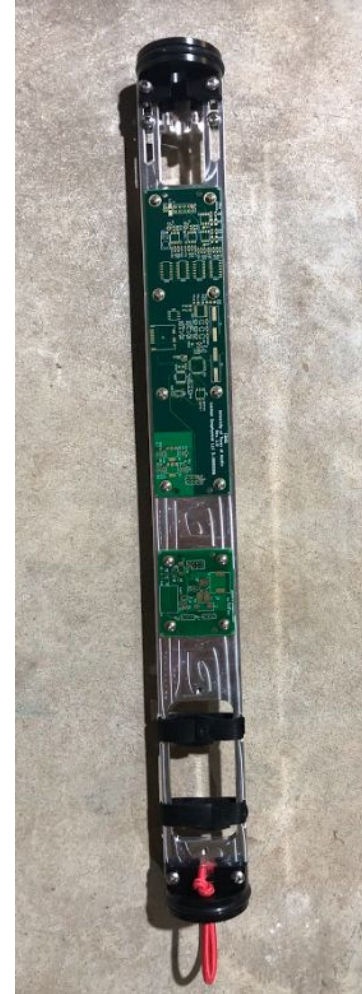
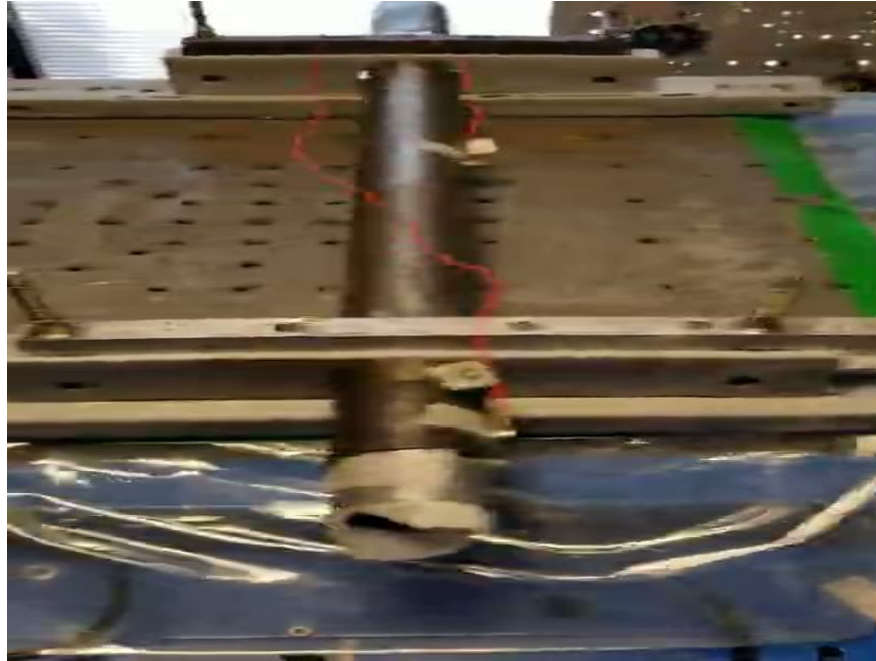
High pressure hydraulics control for rock mechanics experiments



mini-GNI for measuring sea salt aerosols



CDAQ for downhole rock properties measurement



High pressure vessel for X-Ray tomography of rocks deforming

