# MapX – An *in situ* Mapping X-ray Fluorescence Spectrometer for Planetary Science

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The search for evidence of life or its processes on other worlds takes on two major themes: the detection of biosignatures indicating extinct or extant life, or the determination that an environment either has or once had the potential to harbor life. *In situ* elemental imaging is useful in either case, since features on the mm to μm scale reveal geological processes that may indicate past or present habitability. Further, biomineralization can leave traces in the morphology and element distribution of surfaces.

The Mapping X-ray Fluorescence Spectrometer (MapX) is an *in-situ* instrument designed to identify these features on planetary surfaces [1-2]. MapX [1,2] is a full field elemental imager capable of analyzing samples *in situ* without sample preparation. The instrument provides element maps with ≤100 μm resolution over a 2.5 cm X 2.5 cm area, as well as quantitative XRF spectra from regions of interest (ROI) determined through machine learning algorithms. Fluoresced sample X-rays are imaged onto an X-ray sensitive CCD through an X-ray MicroPore Optic (MPO). The MapX design as well as demonstrations of its abilities to spatially map out trace mineralogies of samples will be presented.

[1] Blake *et al*. (2017) *LPSC* **XLVIII**, #1370.
[2] Thompson *et al*. (2017) *LPSC* **XLVIII**, #1602.