Synchrotron X-ray microprobes offer the unique ability to combine X-ray fluorescence (XRF) analysis and imaging with X-ray absorption spectroscopy (XAS) and X-ray diffraction (XRD), and have applications in geochemistry, environmental science, material science, biology, and archeology. The GSECARS X-ray microprobe beamline at sector 13-ID-E provides tunable, monochromatic X-ray beams of 1 to 2 micron size with an energy range of 2.4 to 28 keV and fluxes in the $10^{10}$ to $10^{12}$ photons/sec range. Fast detectors and electronics allow rapid XRF imaging with dwelltimes down to 5 msec per pixel giving high quality full XRF spectra. Fluorescence imaging can be done either in 2-D mapping mode or tomographically allowing 3-D fluorescence imaging for appropriate samples. Because the incident X-ray energy is readily tunable, micro-XAS can be measured on elements with $Z$ at or above 16 (sulfur). In addition, micro-XRD can be used to identify mineral phases either at selected points or simultaneously with XRF mapping. Examples and results will be shown for XRF mapping, micro-XAS, X-ray fluorescence tomography, and combined XRF and XRD mapping.