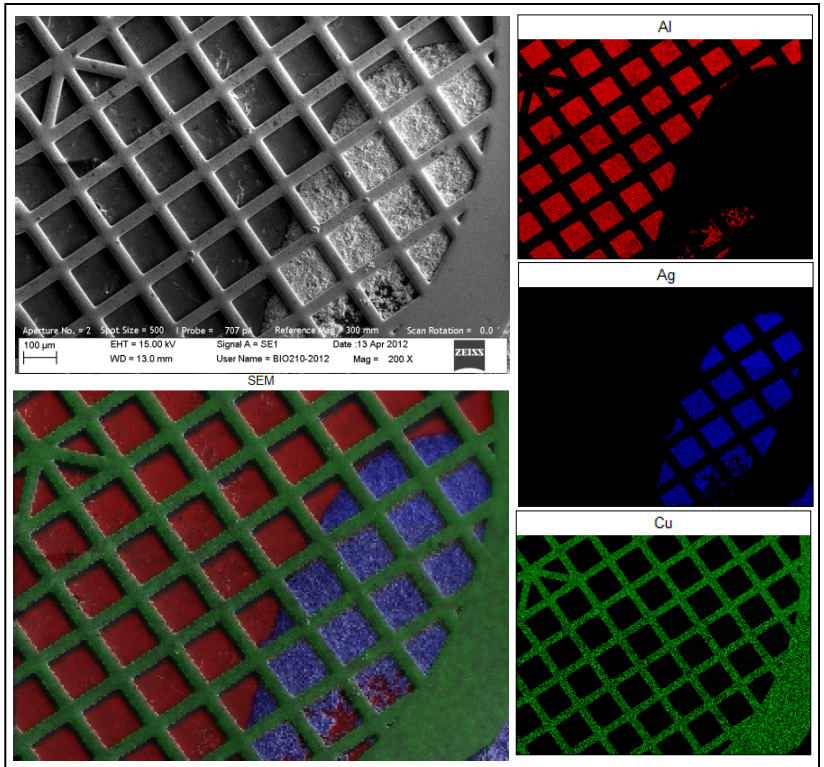
Use of the Analytical Scanning Electron Microscope at Trinity to Support a Regional Meeting of the Society for Physics Students

Ann Lehman (*Trinity College*), DMR-Award #1039588

Intellectual Merit:

An NSF-funded analytical scanning electron microscope (SEM) is used to support outreach activities across the region. At a 2-day regional meeting of the Society for Physics Students hosted by Trinity, the SEM demonstrated principles of physics, such as the interaction of electrons with a specimen. The electrons, controlled by electromagnetic lenses, excite the atoms in the specimen which then emit various signals that are detectable. One signal type – Secondary Electrons (SE) – maps point-to-point intensities of the emission, forming a topographical image of the material. Another signal type – characteristic x-rays – displays x-rays that are unique to the elements that are present. The source of the x-rays is matched to the SE image, providing a precise "elemental map" showing the distribution of the materials that make up the specimen.



Images show both topography (gray) and elemental distribution of a copper (green) grid mounted with silver (blue) paint on an aluminum (red) carrier. Combined (lower left), they provide an elemental map.

Use of the Analytical Scanning Electron Microscope at Trinity to Support a Regional Meeting of the Society for Physics Students

Ann Lehman (*Trinity College*), DMR-Award #1039588

Broader Impact:

The NSF-funded analytical Scanning Electron Microscope at Trinity College was used to demonstrate principles of Physics during a 2-day regional meeting of the Society of Physics Students in Zone 1. Zone 1 comprises the six New England states. These popular presentations provided live, dynamic, hands-on opportunities for Physics students from many institutions to participate in real-time experiences using modern technologies. Images from these exercises revealed not only the microstructural features but the precise identification and location of the elements present in the specimens.