GFIS Technology and Applications:

The gas field ion source (GFIS) technology is one of the newly developed ion source alternatives to the well-established liquid metal ion source (LMIS). The focused ion beam (FIB) systems equipped with the GFIS can offer a range of ion species such as helium and neon, and at an exploratory level, hydrogen, nitrogen, and xenon. The chief advantage of this technology is the high brightness of the source which allows the beam to be focused to a probe size as small as 0.35 nm. The lighter ion species have demonstrated great virtues in applications such as resist lithography, beam chemistry, and imaging. The heavier species offer advantages of higher sputter yields, and shallower penetration depths for precision sputtering with no gallium residue. More recently, these ion beams are being integrated into secondary ion mass spectrometers (SIMS) to provide high resolution analytical capabilities. This portion of the tutorial will provide a detailed view of the technology, and a survey of the applications.

Biography:

John received his undergraduate physics degree from Case Western Reserve University (Cleveland, Ohio), and his physics Ph.D. from U. C. Berkeley. He has worked for a number of instrumentation companies such as AMRAY, KLA-Tencor, and FEI, where he worked on imaging systems, detectors, and electron optics. He was one of the founding scientists of the startup company, ALIS, where he worked to mature the gas field ion source (GFIS) to a point where it was commercially viable. This technology became the ion source for the original ORION Helium Ion Microscope (HIM) instruments. Acquired by Zeiss in 2006, the product has diversified to be a versatile instrument with many nanofabrication and analysis capabilities. Presently, John serves as chief scientist for business development and "technology evangelist" at Carl Zeiss in Peabody, Massachusetts. John has over 30 journal publications, and is named in over 100 patents around the globe.