Axial Region of Interest Analysis Tool (LARIAT)

**LARIAT Electron Spectrometer**
- Large Analysis Area (20 X 20mm)
- < 5um spatial resolution
- Rapid Full Field Chemical Imaging
- Depth Selectivity
- Very large Depth of Field

**NEXAFS:**
- Elemental Selectivity
- Chemical Bonding Sensitivity
- Molecular Bond Orientation

**Hyperspectral Imaging Acquisition & Analysis Package**

Data is acquired as a series of images each at a single primary x-ray energy.

And display as a linear combination of images... or extracted spectra

**Single Strand DNA Patterning:**
- 300 image stack Multivariate Analysis

(Dave Castner, NESAC/BIO, Univ. of Washington)

Successful DNA patterning is revealed by the LARIAT Imaging NEXAFS Spectrometer

Adenine π+

Green = Nitrogen Chemistry in Single Strand DNA
Red = Nitrogen Chemistry in Substrate

**Organic Photo Voltaic Patterning Via SAMs Templates:**
- 3D Spectroscopy Imaging Leads to 3D structural Information

(Dean Delongchamp NIST/MSEL/ Polymers Div.)

NEXAFS distinguishes between the electron acceptor and light absorber chemistries and the LARIAT produces chemical data at varying depth to reveal 3D photovoltaic structural information.

Light Absorber
- P3HT

Surface consists of P3HT absorber “skin”

Electron Acceptor

“Shallow 2D” Chemical Image

“Deep” 2D Chemical Image

3D structure of patterned photovoltaic

**16 Mega Pixel Full Field Image Detection System**

MCP / Phosphor / Optical taper / CCD Camera

**Zoom magnification is possible by decreasing detector B field**