The Monday workshop talks emphasized:

(1) Nanometer sized beams and (2) In-situ scattering and kinetics.

Main points for soft matter & biomolecular materials researchers

- Features that distinguish ERL from other sources:
  - A significant enhancement over synchrotron is low horizontal beam divergence. Crucial for good transverse resolution in grazing incidence diffraction measurements, also for resolving 100nm sized features with 10 nm spatial resolution.
- Important performance specifications for ERL Facility:
  - Should include low-energy undulators: carbon-edge most versatile for hydrocarbon materials but 1-4 keV also has interesting edges (Si, S, P, Ca, …). Gives chemical bonding specificity without the need to alter material.
  - Optics and detectors are integral to source. Need to optimize optics and detectors to problem. Optics preserve coherence.

Soft Matter Applications:

- Energy
  - Spectroscopy on individual ~10 nm metallic nanoparticles under reaction conditions to understand catalytic activity.
  - Measure molecular structure and chemical bonds in organic photovoltaic devices, OLEDS, OTFTs, in-situ during growth and processing. Focus on individual functionalized nanorod assemblies (CNTs, CdSe, …) being incorporated into devices.
- Materials Processing
  - Measure spatial variation in the structure of simple and complex fluids under shear, and extensional stress as well as flow in nanoscale channels. Focus?

Biomolecular Materials Applications:

- Organic/Inorganic Composites (Bone)

  How do nanometer-sized minerals enter (and leave) organic matrix?

- Membranes (Vesicles and Substrate-supported)

  Understand lateral heterogeneity in rafts, structure and function of antimicrobial proteins when self-assembled into pores. Use chemical or photo-induced cues to trigger processes.

- Flow mixing

  Reactants confined to droplets or nanofluidic flow channels. Weak signal requires focused beam to avoid extraneous background scattering. Measure structural changes not just hydrodynamic radius.

The Tuesday workshop talks will emphasize :

(1) Dynamical studies and (2) Imaging.