Abstract: In August 2012, NIST launched the nSoft Consortium as a collaboration of MML and NCNR. The goal of the consortium is to develop neutron-based measurement science in close partnership with industrial members involved in soft materials manufacturing. Neutrons are non-destructive with a high sensitivity to light elements including hydrogen and nitrogen, making them ideal for a wide range of applications in soft materials manufacturing. Topics being explored by nSoft include polymer synthesis and manufacturing, polymer based composites, high concentration protein therapeutics, biological materials such as cell membranes, hydrogen and water storage and transport, oil and gas production, and energy storage. After briefly describing our unique consortium model, where we focus on expertise transfer rather than technology transfer, I will highlight how neutrons have been applied to important problems in soft materials, including the use of neutron scattering to probe protein aggregation, the development of "Rheo-SANS" and measures of extensional (i.e. non-shear) flows, structure of amorphous regions in semicrystalline polymers, neutron imaging of plant growth in soil, next generation chromatography of macromolecules, and water flow through porous membranes.

Bio: Ron Jones is the Director of the NIST nSoft Consortium, a collaboration of the NIST Materials Science and Engineering Division and the NIST Center for Neutron Research. After being awarded a Ph. D. in Materials Science and Engineering from the Pennsylvania State University, he recieved a National Research Council Fellowship to work at NIST in the Polymers Division on microelectronic coatings. In 2004, he was hired as a permanent staff member, and led a project focused on developing measurement technologies for manufacturing of nanoscale and nanostructured materials. His work has resulted in more than 75 publications in photolithography, nanoimprint, nanoporous low-k dielectrics, and directed self-assembly, and has been recognized twice by the Department of Commerce through a Bronze Medal and Silver Medal. Working closely with Intel, IBM, and SEMATECH, he participated in a successful research program to develop "CD-SAXS", an inspection measurement solution for manufacturing sub-50 nm features. In 2008, CD-SAXS became recognized as a viable solution for quality inspection and fabrication testing in in the International Technology Roadmap for Semiconductors (ITRS) Roadmap. The nSoft Consortium represents a new opportunity to bring a similar level of impact using neutron methods in a broader range of manufacturing.